THE IRON AGE

Contents

NOVEMBER 24, 1938

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NOVEMBER 24, 1938

ESTABLISHED 1855 Vol. 142, No. 21

Arnold's Pain Killer—the Latest Patent Medicine

ASSISTANT ATTORNEY GENERAL THURMAN ARNOLD has just taken a step which apparently can lead to Government control of industry's advertising budgets.

At least that is the impression one is likely to obtain from a study of Mr. Arnold's order forbidding Ford Motor Co. and Chrysler Corp. to advertise specific finance companies.

All publications have an obvious and perhaps selfish interest in what Mr. Arnold proposes.

Industry, we believe, will have a similar interest when the implications of the Assistant Attorney General's order are fully understood.

"Monopoly," said Mr. Arnold, "is fostered when advertising is used to put competitors at a disadvantage for the sole reason that they do not have resources sufficient to expend equally large sums in advertising particular products or the services of particular companies . . ."

This means, apparently, that the large company with financial resources to advertise on a broad scale, or the small company which finds it profitable to spend a larger share of its money for advertising than its competitors spend, is going to run into trouble at Washington.

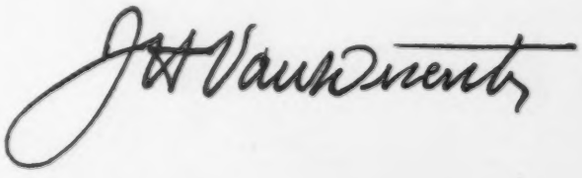
But how about the company which invests a relatively larger share of its money in new machinery, new tools? Is it going to be penalized because purchases of new machinery and resulting better products have brought it more business than its competitors?

How about industrial research? Is that to be curbed through New Deal fears that such research may bring monopoly?

And how about the company which gets more business because its high standard of labor relations cuts its costs?

Frankly, we don't know whether the time will come when a purchasing agent will need an OK from some Government official before signing an order for a new lathe.

However, Mr. Arnold's move to control advertising budgets clearly is another link in the iron ring of control with which the New Deal faction continues, despite the recent election results, to encircle free enterprise and the American way of doing business.



Types of Common Nuts and

THE rapid growth of machinery and machine made products has brought with it an enormously increased variety of small parts. The bolt and nut industry has had a large share of the increase in new styles and types of common parts. The nut industry now produces so great a variety of products that the selection of the best possible combination of strength, accuracy, value and reliability has become somewhat of a problem. While it is true that the American Institute of Bolt, Nut & Rivet Manufacturers has taken the most commonly used nuts and set up standards for them, that are followed by most of the nut manufacturers, yet even these relatively few types present a more or less complex picture.

The man who uses the nuts undoubtedly knows what he wants, but often does not know what can be obtained as a regular standard stock item. By specifying the same type of nut for every job he may lose the advantages of some other types of nuts. He may design a nut to fit his own needs, and have it manufactured as a special, but usually there is some standard nut that will serve his purpose more economically.

Most of the pertinent facts concerning the standards and manufacture of the common nut have been gathered and presented below. Of necessity it has been made brief, and some items of relatively less importance have been omitted.

The terms used with reference to nut dimensions illustrated in Fig. 1 are explained below.

Tapped Hole

The tapped hole is the most important element of a nut, as all dimensions are based on its diameter. The tapped hole is usually threaded with either a coarse or fine thread, sections of which are shown in Fig. 1. The threads shown in Fig. 2 are drawn to the same scale to show the relative proportions of each type of thread. The coarse thread, formerly the USS thread, is now known as the American Standard coarse thread. It is deeper and has fewer threads to the inch than the American Standard fine thread formerly known as the SAE thread. There are several other types of screw threads, but they are not as commonly used, and will not be discussed here.

W—Width Across Flats

The width across flats of a nut governs the thickness of the wall of metal between the hole and the outside surface, the size of the wrench to be used, and the amount of bearing surface of the nut.

B—Width Across Corners

The width across corners dimension is dependent upon the width across flats, and serves to limit the rounding of the corners of the nut.

H—Thickness

The thickness of the nut is the factor which largely determines its stripping strength, all other things being equal, such as type of thread, material, thread fit, workmanship, etc.

C—Bearing Surface

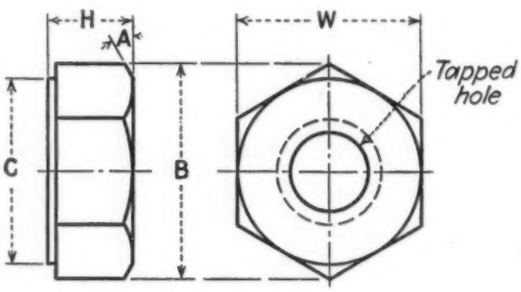
The surface of the nut that comes in contact with the work is called the bearing surface.

Washer Face

The washer face is a small raised washer-like surface machined or formed on the bearing surface of semi-finished and finished nuts. Its diameter is approximately equal to the width across flats, and it has a minimum thickness of 1/64 in. The purpose of the washer face is to present a smooth finished surface to the work and to insure its being perpendicular to the axis of the tapped hole.

A—Chamfer

The crown of a nut is usually chamfered, that is, the corners are formed at an angle, usually about 30 deg. A semi-finished nut may have all corners on both sides chamfered,



ABOVE

FIG. 1—Two views of a nut. All dimensions are based on the diameter of the tapped hole, the most important element of a nut.

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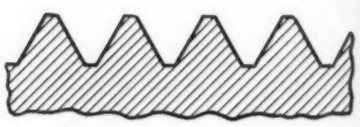
o o o

BELOW

FIG. 2—The coarse thread, known as the American Standard coarse thread, is deeper and has fewer threads to the inch than the fine thread.



Coarse Thread

Fine Thread

* *Metallurgical Engineer—Lamson & Sessions Co.—Cleveland.*
† *Technical Assistant to Vice-President—Lamson & Sessions Co.*

Their Selection

By M. E. HACKSTEDDE*
and A. E. R. PETERKA†
American Institute of Bolt, Nut and Rivet Manufacturers

either flat surface acting as a bearing surface, instead of a washer face machined on the bottom. This type of nut is known as a double chamfered nut, and may be assembled from either side.

Nuts may be divided into four classifications:

I—American Standard regular, heavy, light, machine screw and stove bolt, according to their dimensional proportions.

II—Unfinished, semi-finished and full finished, according to the degree of finish.

III—Hot pressed, cold punched, cold forged and milled from bar, according to the method of manufacture.

IV—Full, jam, slotted and castle nuts, according to styles.

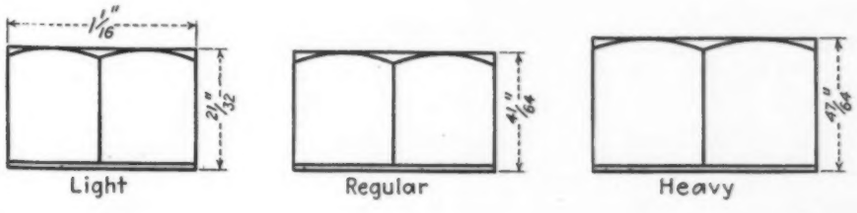
The standards set up by the American Institute of Bolt, Nut & Rivet Manufacturers have three basic classes—American Standard regular, American Standard heavy, and American Standard light. Fig. 3 shows the relative size of each type of nut. The light nut is smaller across flats than the regular nut, but with the exception of the semi-finished regular nut, has the same thickness. The American Standard regular and heavy semi-finished nuts are 1/64 in. to 3/64 in. thinner than the unfinished and finished nuts. This variation was made to allow for machining unfinished nuts to the semi-finished class.

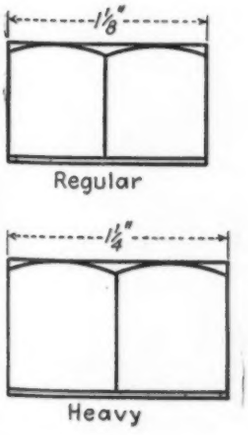
The American Standard "heavy" nut is both wider across flats and thicker than the American Standard "regular" nut. Both the regular and heavy nuts are usually tapped to the American Standard coarse thread. The American Standard "light" nut is tapped to the American Standard fine thread.

The standards for machine screw and stove bolt nuts cover both the plain square nut and the chamfered hexagon nut. The square nut is usually furnished with stove bolts. However, hexagon stove bolt nuts and square machine screw nuts are not uncommon. Both types are made by cold punching.

Fig. 4 shows the different types of finish that nuts may have. The most commonly used nut is the unfinished. It is tapped, but has no further machining or finishing on any of its surfaces. This type is made either hot pressed or cold punched, and may be made hexagon or square. The semi-finished nut is tapped, and has either a washer face formed on the bearing surface, or is double chamfered with either side acting as the bearing surface. Semi-finished nuts are made by milling from the bar, cold forging, or cold punching. Full finished nuts are used in comparatively small quantities today and are usually made to the customer's specifications.

The finish and strength of a nut is affected to a considerable extent by the method of manufacture. For instance, the hot pressed nut is distinguished by the black oxide coating or film with which it is covered. It has rough sides and somewhat rounded corners. This type is made by punching nut blanks from hot rolled low to medium carbon steel bars at





AT LEFT AND ABOVE

FIG. 3 — Relative sizes of the various types of nuts. Note the light nut is smaller across flats than the regular nut, but with the exception of the semi-finished regular nut, has the same thickness.

BELOW

FIG. 4—Types of finishes.

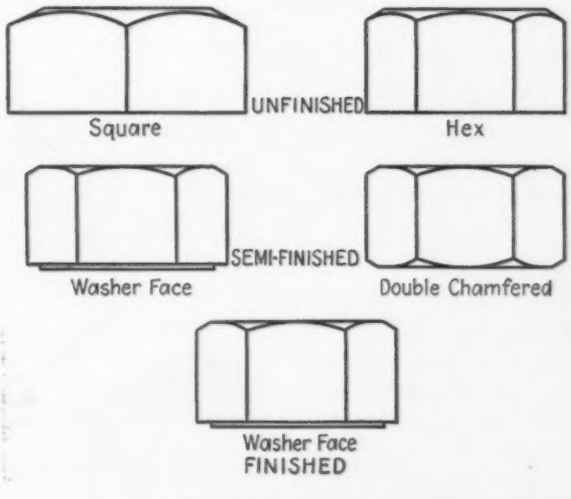


FIG. 5—Steps in the cold forging process, which consists of upsetting the hexagon nut blank from round wire.

forging temperature. The nut blanks are cooled before burring and tapping on different machines. The slow cooling of the metal in air from the high temperature forms an oxide scale on the surface, as well as serving as an annealing process which leaves the material in a comparatively soft state. The black oxide scale, which covers its entire surface, except in the threads, acts to a slight extent as an inhibitor of mild corrosion. The hot pressed nut is limited to uses where rough unfinished surfaces are to be held together, and extreme accuracy is not a necessity. If necessary, a nut of greater strength can be made by using steel of a higher carbon content.

The cold punched nut, on the other hand, has a bright finish. The edges and corners are sharper, and it is a fairly accurate nut capable of being held to closer tolerances than the hot pressed nut. The cold punched nut is punched and trimmed from a bar of low carbon steel. As in the case of the hot pressed nut, the cold punched nut is tapped on a separate machine. The cold punched nut can be faced on the bearing surface, and otherwise finished so that it is in the class of the semi-finished nut, although ordinarily the cold punched, as well as the hot pressed, is sold as an unfinished nut.

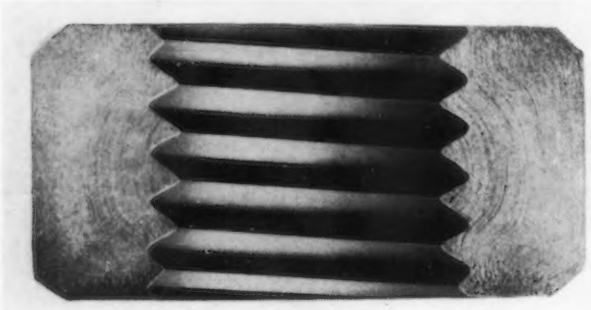


FIG. 6—Cross section of a cold forged nut, etched to show the flow lines.

A bar nut is distinguished from the hot pressed and cold punched types by smooth sides, sharp edges, and shiny surfaces. It is made by cutting or milling, usually from low carbon bar stock, but can be made from almost any machinable material available in bars. The bar nut can be held to closer tolerances than either the hot pressed or cold punched types, and is furnished either as a semi-finished or finished nut. It is commonly used with machined or finished surfaces, and similar applications where its accurate dimensions and smooth finished appearance make it valuable.

The cold forged nut is the result of the latest development in nut manufacture. It combines the accuracy and smooth finish of the semi-finished bar nut with the toughness of the cold punched nut. The cold forged nut is usually made with a double chamfer, and with both ends of the tapped hole countersunk. These features add to the ease and speed of assembly. The cold forging process consists of upsetting the hexagon nut blank from round wire in several steps as shown in Fig. 5. The nut is tapped on an automatic tapping machine, and requires no additional machining to make it a semi-finished nut. The steel used in manufacturing the nut is hardened to a considerable extent by the cold working necessary to produce the hexagon shape from round wire. In addition to the cold working which adds to the hardness and strength of the nut, the forging of the metal arranges the flow lines of the crystal structure in such a manner as to oppose the forces that normally tend to split the nut. Fig. 6 shows a cross section of a cold forged nut etched to show the flow lines. A feature of this process that was at first a source of annoyance to the manufacturer, has proven to be of benefit to the customer. The severe upsetting of the wire causes even the very small seams and cracks to open up, easily visible to the eye. As the nuts are all carefully in-

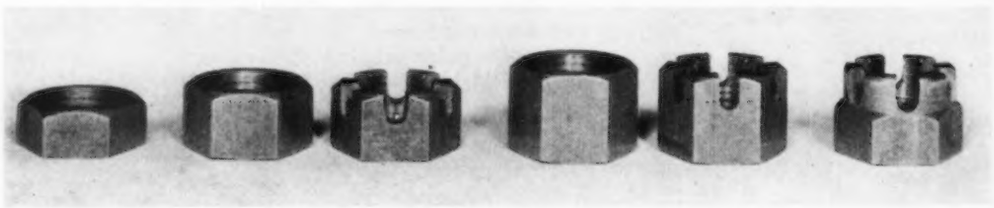


FIG. 7—A set of American Standard light nuts arranged in order and showing the difference in dimensions.

AMERICAN STANDARD STOVE BOLT & MACHINE SCREW NUTS
SQUARE & HEXAGON

AMERICAN STANDARD REGULAR			AMERICAN STANDARD HEAVY			AMERICAN STANDARD LIGHT
Hex. & Square Unfinished Jam (Hex.) Reg	Hex. Semi-Finished Jam Reg Slotted	Hex. Finished Jam Reg	Hex. & Square Unfinished Jam (Hex.) Heavy	Hex. Semi-Finished Jam Heavy Slotted	Hex. Finished Jam Heavy	Hex. Semi-Finished Jam Light Slotted Thick Thick Slotted Castle

spected the buyer is insured of material free from defects.

The process has been developed to such an extent that non-ferrous alloys, as well as plain carbon steels, have been successfully cold forged into nuts. Cold forged nuts can be made of almost any material that can be cold upset.

The general standards, finishes and types of manufacture that have been discussed cover a great many different sizes and styles of nuts. The following table lists the various standards and the types of nuts which they cover. It will be noted that the American Standard light nut is usually made semi-finished hexagon, and that in addition to jam, light and slotted nuts, it is made in the thick nut, thick slotted nut and castle nut. Fig. 7 shows a set of American Standard light nuts arranged in the order named above to show the difference in dimensions. American Standard regular and heavy nuts are made finished, semi-finished and unfinished. Square nuts are made only unfinished and are not available in the jam or slotted styles.

The subject of nut standards and manufacture is more complex than has been pictured above. However, the general facts concerning common nuts have been covered and may prove to be of assistance to the person who uses or buys such products.

Ingots Flame-Cut to Blooming Mill Size

USE of flame cutting in splitting 3 per cent nickel ingots into sizes suitable for rolling is shown in the accompanying illustration.

The plant at which this was done had a rush order for strips of the same analysis, but the ingots, which had been in their yards for several years, were too large to be handled by the bloomer of the 72-in. strip mill. They weighed 10 to 15 tons each, and ranged in size from 20-in. x 60-in. x 5-ft. to 24-in. x 68-in. x 7-ft. The ingots had accumulated a crust of dirt and scale and several of them had developed large cracks. In addition they contained blowholes and gas pockets.

o o o

NICKEL steel ingot being cut to blooming mill size by means of a portable oxy-acetylene cutting machine. When because of dirt and blowholes, the cut became lost, an oxygen lance was brought into play. (Photo by courtesy Linde Air Products Co.)

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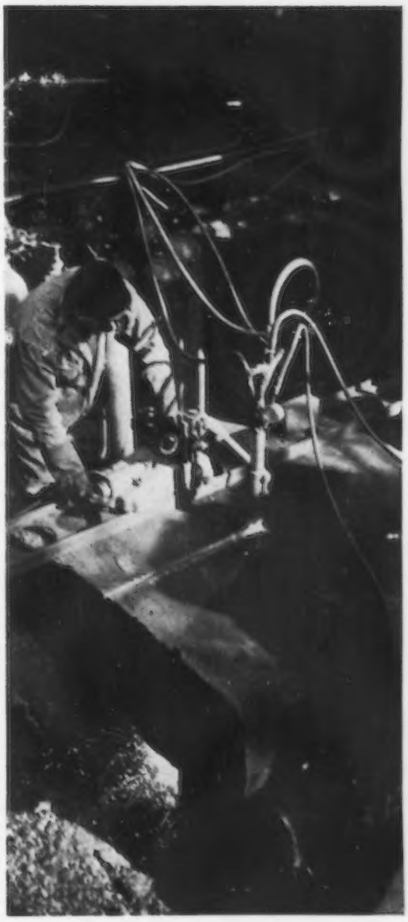
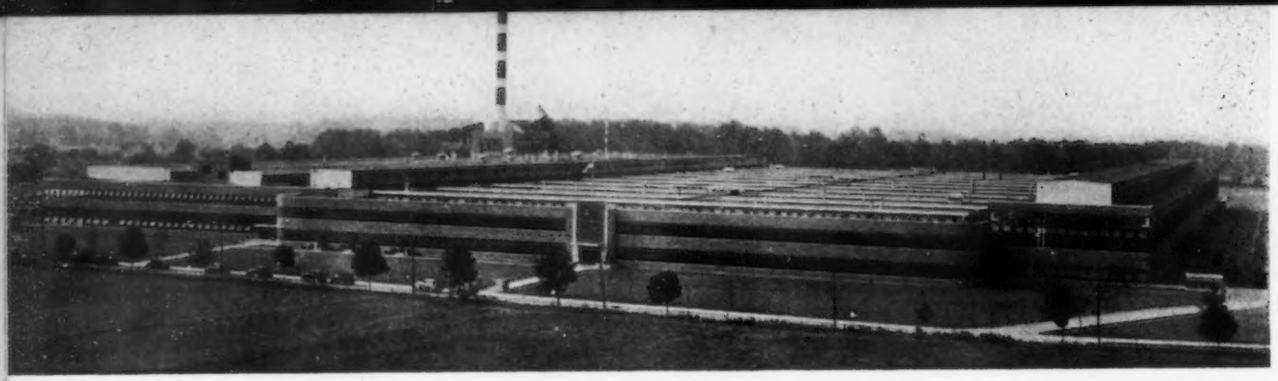


Although as much of the scaly surface as possible was removed before cutting, the generally poor condition made necessary a somewhat specialized cutting procedure. The equipment consisted of a heavy-duty portable cutting machine mounted with a special heavy-duty, water-cooled blowpipe. Oxygen cylinders were manifolded, and the acetylene supply was obtained from a stationary generator. The cutting machine was set to travel at a speed of 2½ to 3 in. per min. and the oxygen pressure was maintained between 50 to 60 lb. per sq. in.

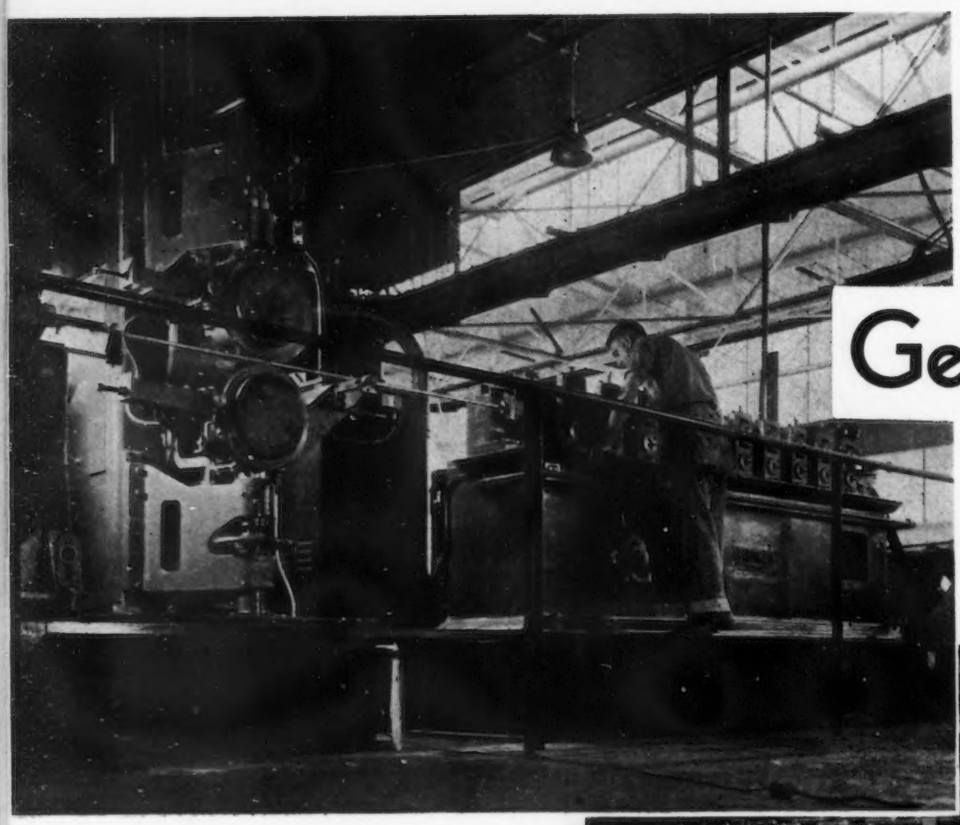
At the start of the cutting it was found that dirt and blowholes were sufficient to cause the cut to be lost after it had progressed only a few inches. This difficulty was overcome, and continuous cutting action maintained, by use of an oxygen lance rigged up out of ⅛ in. diameter pipe. Each time it appeared that the drag on the cut was getting too great and that the cut might be lost, the lance was brought into play. A supplementary oxygen gage mounted on the inlet of the blowpipe by means of an adaptor provided the operator with an exact reading of the oxygen pressure right at the blowpipe.



ABOVE

FRONT view of the Ternstedt Trenton Division plant of General Motors. The new 20-acre factory, which is being operated under the jurisdiction of the Fisher Body division, produces body hardware and fittings for shipment to assembly plants in the East and South.

General Motors



ABOVE

A VARIETY of roll forming machines of special design are used to produce from coiled strip stock the large number of formed sections developed for the Fisher Unisteel turret top body. This photograph shows such a set of forming rolls making U-shaped roof bow members. The unit at the left is a continuous roll or seam welder, followed by a cut-off machine.

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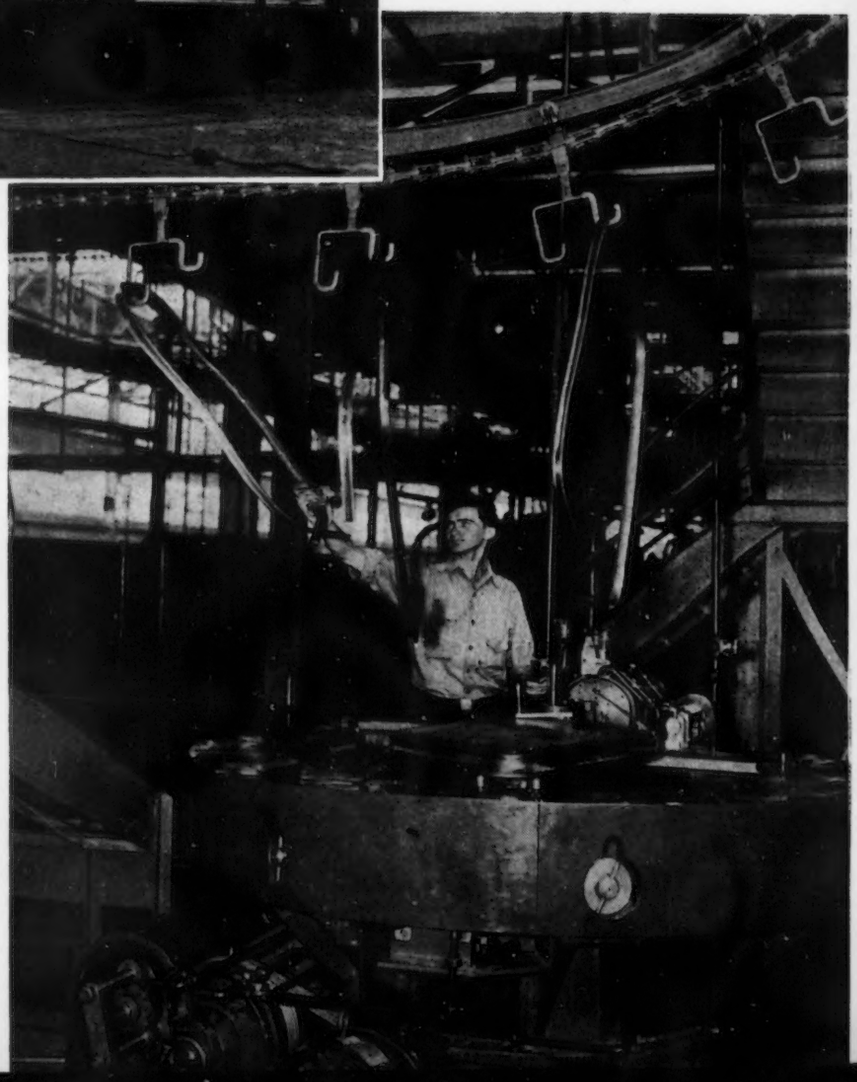
AT RIGHT

CHANNEL-SHAPED sections formed from strip stock in roll forming machines are literally wrapped around this rotating, horizontal bending fixture to form garnish moldings for window frames for Fisher bodies.



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WOOD graining effects being produced on garnish molding with the aid of gelatin rolls produced by a proprietary process. The two graining rooms are air-conditioned. Prior to graining, the moldings have been degreased by a solvent cleaner, dipped in a ground coat and baked for 30 min.

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Opens Its Ternstedt Trenton Division

PRACTICALLY every handling operation at the new Ternstedt Trenton (N. J.) Division of General Motors Corp. is completely mechanized through the use of monorail conveyors, conveyor belts, elevators or chute-feed bins. Wherever possible, the material handling equipment is designed to deliver the work at the correct table level so as to eliminate bending or reaching on the part of the operator. The plant, which has recently been completed, will be operated as a unit of Fisher Body.

Another provision in the interests of the worker is the establishment of banks of materials at strategic points to prevent the layoff of operators further along the production cycle in the event of equipment failure. In addition, a month's supply of raw materials will be kept on hand at all times in a 75 by 920-ft. storage craneway, including 2500 tons of strip steel, 900,000 lb. of zinc, 36,000 lb. of aluminum and 27,000 lb. of copper. There are also large storage hoppers between many of the individual machines. It will also be possible to store 18½ days' production of body hardware in the warehouse, so that Ternstedt can continue to supply Fisher Body and General Motors plants if an unforeseen plant shutdown should occur. This storage system will also permit the rotation of parts manufacture in the different progressive work lines.

The operations carried on at this plant, like the main Ternstedt plant in Detroit, consist primarily of metal forming and stamping, metal finishing, die casting, polishing and plating. At the Trenton plant, 19 die casting machines have been installed, 13 of them with a die capacity of 18 x 18 in. to take care of the larger items. Four large melting furnaces fired by propane gas supply the zinc-base alloys

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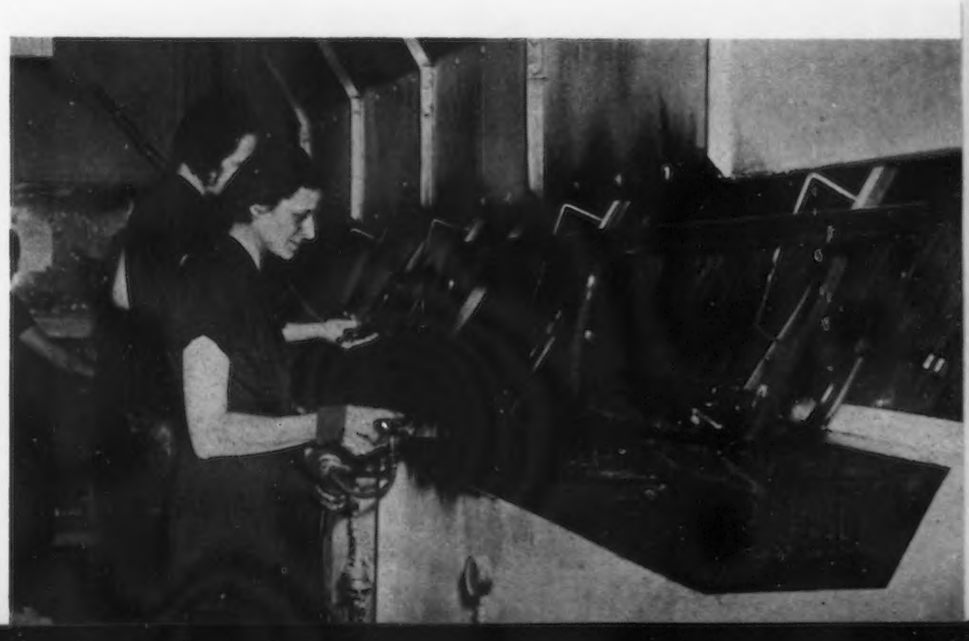
AT RIGHT

AFTER the pattern is placed on garnish molding in the graining department, a "smoke" or shading spray coat is applied on certain portions of the frame, followed by a 20-min. bake. This spraying is done in the water-wash spray booths shown, supplied with filtered air and eliminating the necessity for face masks. A chemical is added to the wash water to dissolve all lacquer particles before air from the booths is exhausted into the atmosphere.



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DIE-CAST automobile door handles are polished in this special automatic buffing machine, 64 ft. in length and equipped with 10 heads disposed at various angles so as to take in every part of the work piece. Following polishing operations, the handles are transported by monorail to an automatic solvent degreaser prior to plating.

o o o

to the machine, handled in ladles by an overhead monorail. In the same department are automatic polishing machines and automatic nickel and chromium plating machines.

There is another large automatic nickel plating machine in the division devoted to the manufacture of control ventilating parts and assemblies. Here also have been installed straightline polishing machines, and a battery of 13 tumbling barrels for polishing small parts. Roll forming machines and special bending apparatus convert the strip steel into the desired shape. Similar equipment is used in the garnish molding department, except that the finishing process, that of graining (illustrated), is different. In this section, besides five separate forming roll lines for strip stock, there is a battery of 133 presses ranging up to 180-ton capacity. Overhead monorails weave through this section, including one

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VIEW of the 120-ft. long automatic bright nickel plating machine where the work, such as the door handles shown on the racks, are lifted out of one tank and transferred to another automatically. All plating solutions are controlled by a central laboratory.

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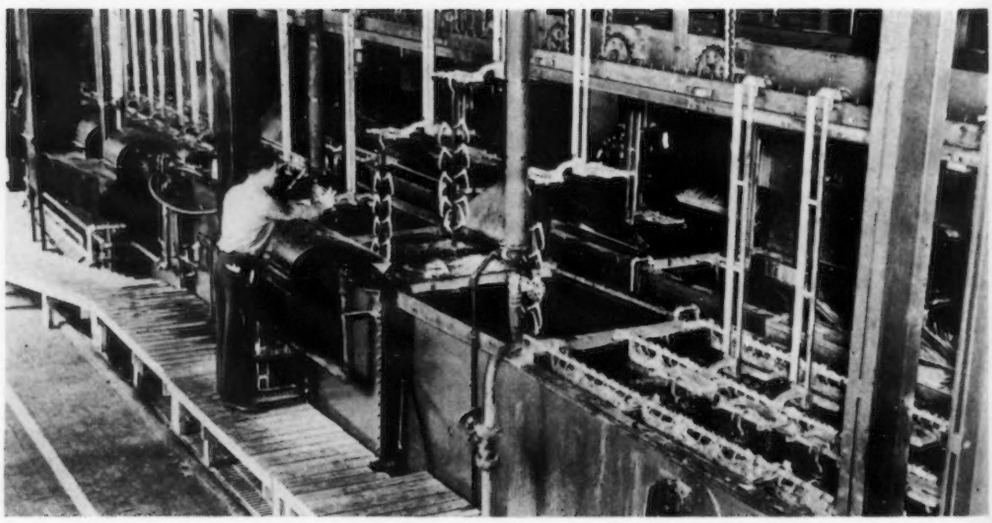

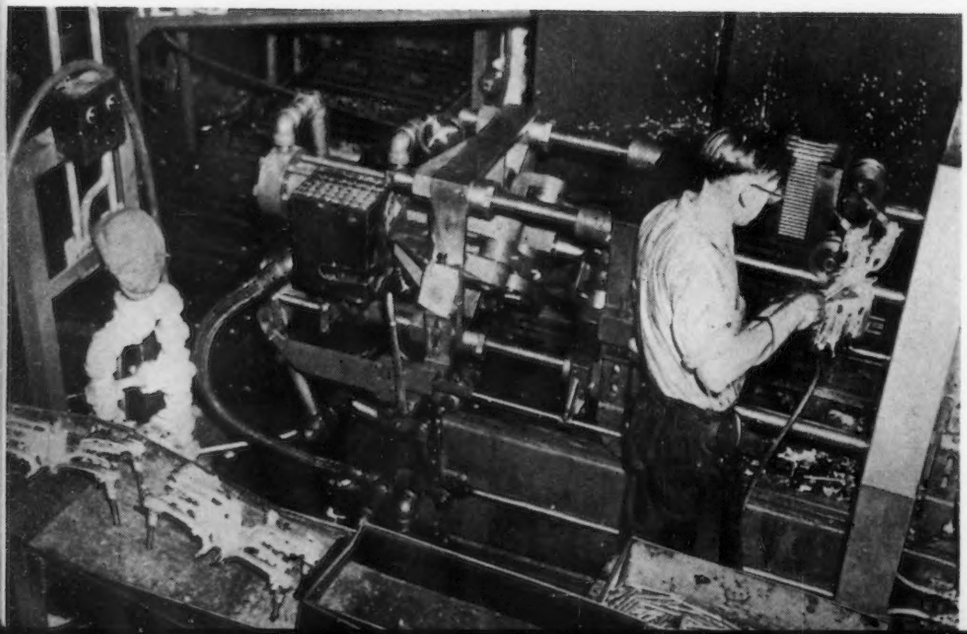

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OUTSIDE door handles are produced in a group of four die casting machines, supplied with a zinc-base alloy brought to them in ladles by means of an overhead monorail conveyor. After being cast, the handles go to the trimmers, then to a battery of machines where the steel inserts are machined. Handling is performed by monorails, but there are also two belt conveyors serving the die casting department.

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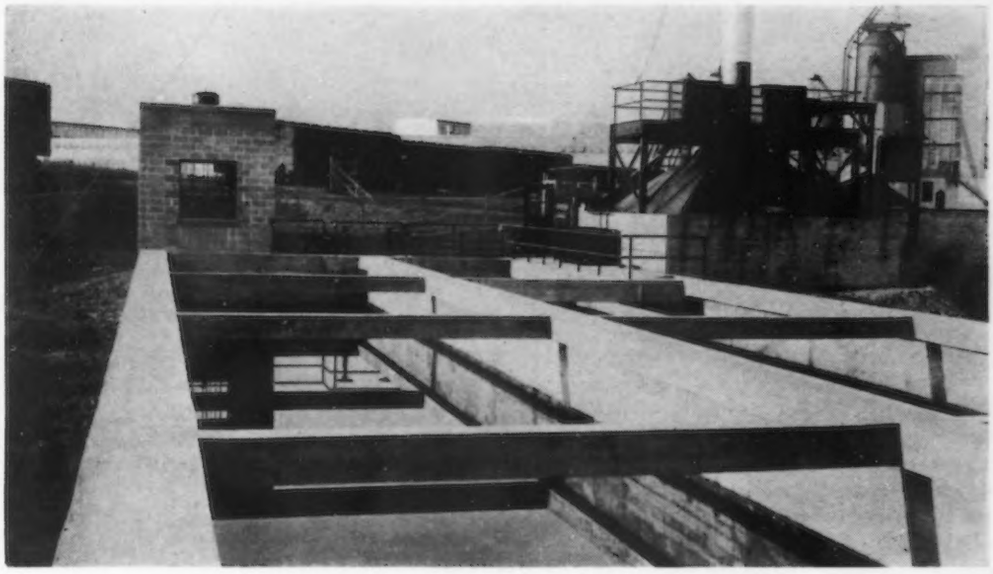

WASTE material from plating solutions is neutralized in these tanks before being discharged into sewers. Daily waste is passed through one of these 18 x 120-ft. tanks at the rate of 150,000 gal. per hr., the chemical neutralization treatment taking about 1 hr. Treatment of the week-end waste is done in the other 175,000-gal. tank at a much slower rate. Occasional large dumpings of nickel and copper cyanides are neutralized in a glass-lined tank of 13,500-gal. capacity over a three-day period, and both the nickel and copper are recovered. The cyanogen gas produced in the process is diluted with 5000 c.f.m. of air supplied by two fans and exhausted through a stack.

line that contacts every inspection station and carries rejected pieces to a central salvage station.

The paint finishing section is a separate section, with three paint lines serviced by means of a unified system of overhead monorail conveyors. Spraying is done in modern water-wash booths supplied with filtered air, and paint is supplied from a central storage and mixing room. Graining is done in two separate air-conditioned rooms.

In the mechanical hardware department, there is a battery of spot and projection welding machines, as well as a sizable group of presses. Many unexposed parts made in this department are finished in a black enamel coating in an overhead enameling installation, over 100 ft. long. Other arts go through a bonderizing treatment combined with a ground coating. The bonderizing units are of the spray type. Deck component, door and remote control locks are produced in another section of this department. Zinc-coated strip stock is used in the manufacture of all parts where no welds are required; others are zinc plated after fabrication in an automatic barrel type plater, in which the work is carried through the various solutions while being rotated in rubber-lined baskets.

The outside door hinge manufacturing section is interesting in view of the fact that elevators or bucket conveyors, some of which have both horizontal and vertical movement, are employed in conjunction with slides to convey the parts from one machine to the next. This method of material handling is used because of the weight of the parts, such as hinge straps made out of 9/32 in. cold rolled steel. Another feature is the use of large divided storage hoppers for separating male and female blanks and holding banks of semi-finished parts while tools are being changed in such machines as broaches.

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CHROMIUM plating of body fittings is performed on this automatic machine, 54 ft. in length. The cam controlled arms raise and lower the racks out of and into the various baths. This plating unit is centrally located and is served by monorails coming from the nickel-plating inspection stations. After chromium plating, a decorative striping is applied by hand.

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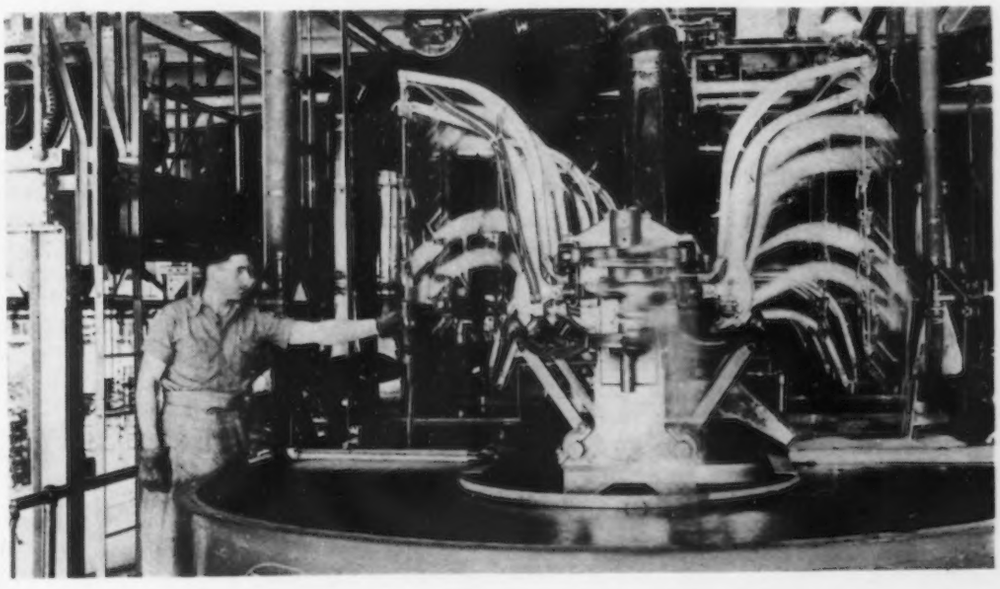


Applying Electric-Furnace

A VARIETY of forms of brazing metal can be used, such as wire, foil, slugs, electroplate, molten spray and paste. Some of these forms are pictured in Fig. 53. The choice depends upon a number of factors which are related to the size and shape of the product, accessibility for applying the brazing metal, quantity of brazing metal required, desired appearance of the brazed product, and last but not least, cost.

The following discussion is based in general on the use of copper as the brazing metal. Although it holds in most cases for lower-melting alloys as well, there are exceptions. The location of the brazing metal, the form, and the amount, have a great deal to do with the success of the job, and for that reason the subject of applying the brazing metal deserves consideration.

BECAUSE of its basic importance, the subject of location, form and amount of brazing metal for various types of furnace-brazed jobs is dealt with at length by Mr. Webber in this sixth article of his series. The discussion deals for the most part with copper as the brazing metal. The illustrations are drawn from successful practice in various fields.

Wire Convenient to Use

A common form in which brazing metal is applied is that of wire rings. Many assemblies have cylindrical members, over which rings fit nicely. In addition, the rings provide a medium for supplying the same amount of brazing metal on every assembly, and the cost of the rings and the cost of applying them is quite low. The rings can be formed by hand, if necessary, but most companies make them up on automatic machines or wind the wire on mandrels and then cut through the helices thus formed with shears or nippers.

Some companies form rings on ring coilers made by Sleeper & Hartley, Inc., Worcester, Mass. These machines make from 25 to 200 rings per min., depending upon the sizes of rings and machines, and feed them on to long shafts which are used for transporting and storing the rings so that they do not become locked into each other. After starting the machine, the operator is free to do other work until a shaft is filled.

Another company successfully employs a simple manual-winding outfit consisting of a crank, some gears, and a chuck, with an assortment of about 50 mandrels, any one of which can be put into the chuck to form helices of the desired size. While the crank is turned with the right hand, the wire is fed on to the mandrel with the left. The various assemblies which come through the brazing department are carefully card-indexed, with the sizes of the wire rings indicated on the cards by mandrel numbers and wire gages.

An ordinary commercial grade of copper wire is generally employed for electric-furnace brazing. Annealed wire is commonly used because it is easily formed, but, in some cases, hard wire is more desirable. If springiness is needed to hold the wire in position, the rings should be made of hard or half-hard wire.

Hints on Placing Wire Rings

The sketches shown in Fig. 54 give a few practical hints on putting the rings in place. When pressing a copper-wire ring down over a vertical-cylindrical member, as at *A*, the ring is commonly pushed clear down against the shoulder. On some products, however, it is found that the brazing metal tends to flow out on the shoulder instead of flowing down into the joint. For this problem an effective remedy is to leave the ring slightly above the joint as indicated. The ring must be formed slightly undersize, of course, in order to hug the tube. Then, when it melts, the brazing metal will flow down the wall of the tube and enter the joint before it can get across on the horizontal shoulder. Once the brazing metal starts into the joint, it is likely to be drawn in by capillary attraction, so this scheme can generally be counted upon to give positive results.

When the cylindrical member has a horizontal axis, as shown at *B*, Fig. 54, it is quite important to place the copper ring snugly against the shoulder so that it can be drawn into the joint as it melts. If it is some distance from the shoulder, it may run down around the walls of the tube before it has a chance to creep over to the joint. For the same reason, it is important that the shoulder make a square corner with the tube and not be rounded or chamfered.

When spuds are pressed into the walls of hollow receptacles, there are sometimes reasons for putting them on the outside or the inside, as shown at *C* and *D*. If they are placed on the inside, as at *C*, it is easy to swage the projecting ends on the outside. Flattening of the cylinder wall generally takes place during the swaging, which is desirable in order to provide good contact throughout the joint. Obviously it is impossible to apply a copper ring to the outside, but a copper ring can be snapped over and locked into a groove made by the chamfered corner of the spud which butts against the cylinder wall, as shown at *C*. When attached in this manner the rings can be depended upon to stay in place, even though they are out of sight inside the assembly. When the copper melts, it will flow to the outside showing that the joint is brazed, assuming that the shell is properly vented as will be discussed later.

If the spud should project inward from the outside of the shell, as shown at *D*, Fig. 54, it is not so necessary

* "Silver Brazing Tubes to Tube Sheets," by Leo Edelson, Handy & Harman, New York. *The Welding Journal*, February, 1938, Page 32, Vol. 17, No. 2.

Brazing Metals

By H. M. WEBBER
Industrial Department, General Electric Co., Schenectady, N. Y.

to chamfer the corner of the shoulder because it is easy to see whether the rings are in place next to the joints when the assemblies are set up on the furnace conveyor or charging trays.

Rings Embedded in Grooves

It is frequently desirable to embed the rings in grooves within the joints, as shown in Fig. 55. For example, the valve body of a refrigerator float chamber shown at *A*, and also shown photographically in Fig. 22 [IRON AGE of Sept. 15, page 32] is best prepared for furnace brazing in this manner.

Formerly, a copper-wire ring was placed around the outside of the shoulder next to the joint. This arrangement gave a good braze but the copper crept up into the threads, requiring that they sometimes be cleaned out, and it also flowed down the sides of the float chamber and sometimes had to be ground off the bottom where a weld was subsequently made. By cutting down on the amount of copper, which ordinarily solves such difficulties, it was found that insufficient brazing metal was available to supply the joint after the copper ran over the surfaces of the shell. However, by putting the ring inside the groove as illustrated, only sufficient copper is supplied to braze the joint, and the troubles described have been completely eliminated. The assemblies are now furnace brazed with neat fillets at the inside and outside extremities of the joints, and with the surrounding surfaces completely free from copper.

The view at *B*, Fig. 55, shows a copper-wire ring in a groove where it is desired to make sure that it will be properly located. When parts are being turned on screw machines it is a simple matter to add a groove for the brazing metal.

Rings Held in Place by Shoulder

Fig. 56 gives another suggestion in the use of wire rings, indicating the desirability of a shoulder in order to hold the ring in place. *A* shows a tube projecting above a collar, to serve this purpose, while *B* shows the collar projecting up over the end of the tube. In either case the wire ring will keep its position while the assembly is being handled around the shop and carried through the furnace, and the corner will serve as a reservoir for the molten brazing metal.

On the other hand, it is obviously difficult to positively locate a ring when the surfaces are flush, as shown at *C*. If the assembly must have flush surfaces, it would be best to try to put the copper in a groove in the tube.

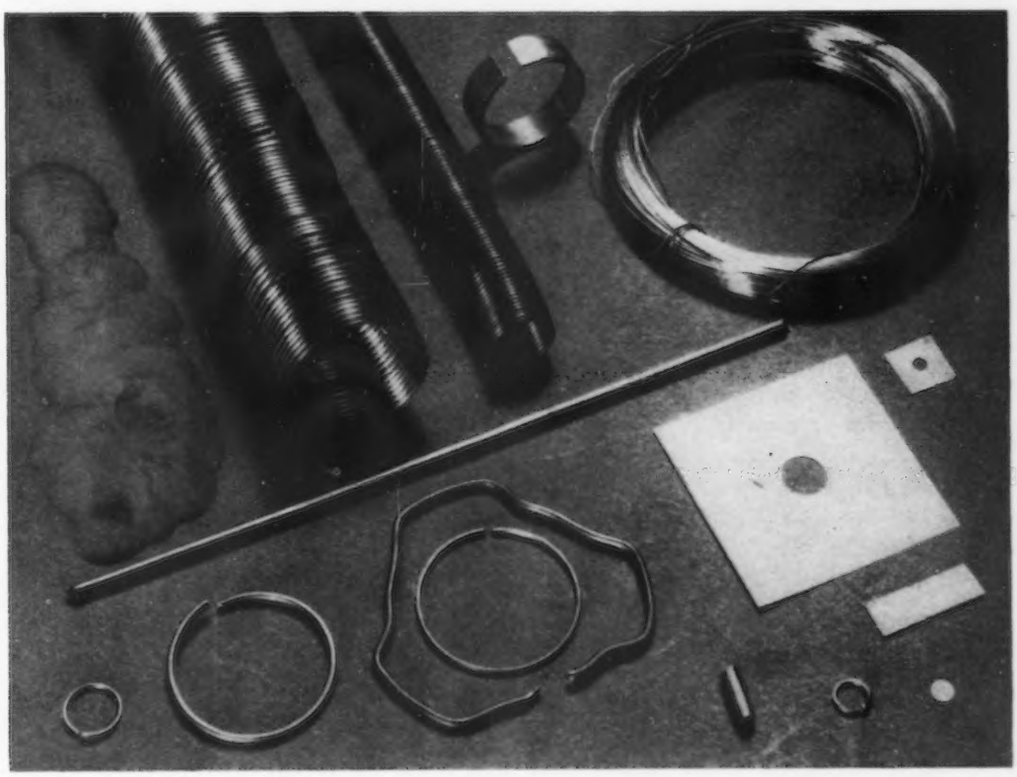
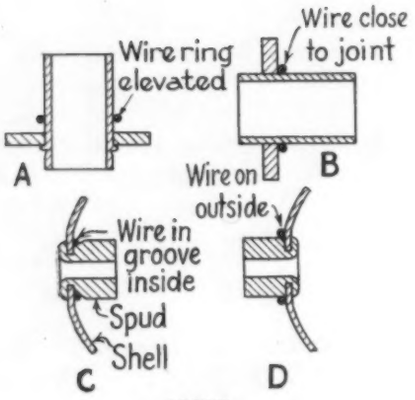


FIG. 53 — Available forms of brazing metal include powder; helices wound on a mandrel, to be subsequently cut by shears; bands; wire in coils and in straight lengths; rings; and foil in various forms, as shown at right.



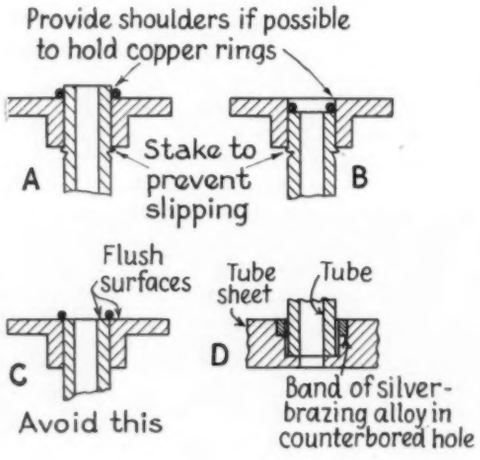
ABOVE

FIG. 54 — Different methods of attaching wire rings to parts preparatory to furnace brazing: *A*, vertical axis, ring above joint; *B*, horizontal axis, ring close to joint; *C*, inside spud, wire in groove inside; and *D*, outside spud, wire outside against shell.

o o o

AT RIGHT

FIG. 56—Provision should be made to fix the location of the rings, and to provide a reservoir for the brazing metal as it melts, as shown at *A*, *B*, and *D*.



A compromise would be to chamfer the end of the tube and countersink the hole to provide a trough in which the copper ring could lie while passing through the furnace.

Leo Edelson* has shown a good way to provide a reservoir for silver-brazing alloys when brazing tubes to tube sheets, by counterboring the holes to receive bands of the brazing alloy as at *D*, Fig. 56. This ingenious scheme works quite effectively.

It is sometimes desirable or necessary to tie the ends of copper-wire rings in order to hold the wire in place. This is frequently so when the diameter of the parts is rather large, say 2 in. or more, because the rings then become so large that they might not stay well in place unless tied.

Straight Wire for Straight Seams

Wires in straight lengths are sometimes used for brazing straight seams. The butt-jointed tube shown in Fig. 57, for example, would be furnace brazed in this manner. It is desirable to have the joint at the bottom, when passing through the furnace, so that the copper can puddle into it. Butt joints such as this are difficult to furnace braze successfully because of their tendency to open up in the heat.

It is well to avoid vertical seams such as shown in Fig. 58, if possible, because the copper flows downward due to the force of gravity, and it may not braze the joint.

If straight wires are used inside of tubular members they can generally be of any length desired. But if used on the outside of assemblies, it is best to limit their length to, say, 6 in., if possible, and to use several pieces end-to-end if necessary. Long wires sometimes twist and warp in the heat and it is difficult to keep them in place. Also it is difficult to keep them straight in handling them around the shop.

Some companies use machines which automatically straighten and cut wire into desired lengths at relatively high speed. The Artos Engineering Co., Milwaukee, makes a machine commonly employed for this purpose.

Foil Sometimes Used As Brazing Metal

Brazing metal in the form of foil, cut from sheets or strip, is another convenient form for certain jobs. In this form it is easy to apply, gives good uniformity, and is economical.

A good example of where foil has been used to advantage is in the preparation of the float shown in Fig. 59. Formerly, a copper-wire ring was tied around the middle where the half shells join and a small amount of copper-powder paste was daubed on the bracket at the top to assure the filling of any pores developed in the projection welding of the bracket to the shell. By experimenting it was found that a piece of copper foil, 0.010 in. thick by 1½ in. square, would give equally good results with considerable savings in the cost of preparation. Now, when the foil melts, the copper not only forms a nice fillet around the bracket and fills any pores in the welds, but it also runs down over the upper shell into the joint and forms a neat fillet entirely around the middle seam, giving a uniformly-tight product with negligible rejections for leaks. The success of this scheme is partly due to the smooth surfaces of the strip steel of which the shells are made, on which the copper flows readily instead of adhering. The former operations of tying the ring and daubing the paste were performed by separate operators, while now the pieces of copper foil are put on the assemblies by the furnace operator after the floats are set up on cylindrical supports on the furnace conveyor.

Foil Put Inside of Joints

Fig. 60 shows two ways in which foil can be put inside of joints. *A* illustrates use of a foil-copper washer for brazing refrigerator cranks. When the copper melts, it creeps throughout the entire joint. Copper can be seen on the end of the tenon by looking into the hole in the shaft—an indication that the joint is brazed.

Foil is sometimes used between two members, as shown at *B*, in which case

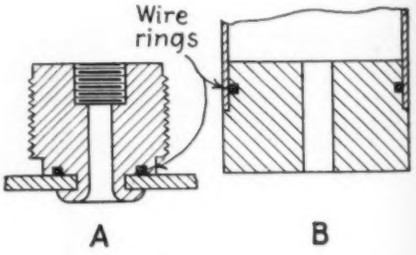


FIG. 55—Wire rings can be embedded within the joints in grooves as shown here.

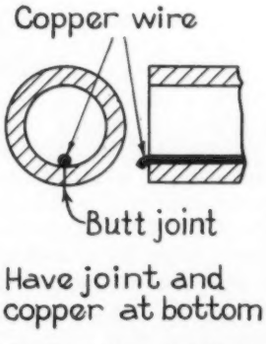


FIG. 57 — When straight seams are encountered, brazing metal can be applied in the form of straight wire, placed above the seam wherever possible. Short lengths of wire are sometimes used on outside seams to avoid warpage of long pieces.

it is well to allow sufficient clearance so that the upper member can settle down after the brazing metal melts, in order to provide intimate contact between the surfaces to be brazed and to fill any voids which might form. For the same reasons it is necessary that the abutting surfaces be square and flat.

Fig. 61 illustrates a copper-brazed refrigerator crank prepared with copper foil as shown in section in Fig. 60, at *A*.

Fig. 62 illustrates an assembly with a piece of foil between the members to be furnace brazed, carrying out the idea shown at *B*, Fig. 60. This assembly, furnace brazed by the Queen City Steel Treating Co., Cincinnati, for the White Mfg. Co., Morton, Ill., was formerly a brass casting, but was unreliable as to strength. It is a sliding-bracket assembly for funeral-parlor wreath holders. Now that it is furnace brazed it has greater strength and lower cost than the casting. In preparing the assembly, a piece of Handy & Harman's Sil-Fos silver-brazing alloy, 0.006 in. thick by $\frac{3}{8}$ in. square, is inserted within the joint between the brass stud and the rectangular brass tube. "Handy" flux is then painted on the parts at the joint, and the assemblies are placed on the furnace conveyor. The time in the controlled-atmosphere heating chamber is about 5 min., and the furnace temperature 1550 deg. F. Fig. 63 shows two photomicrographs, one of low-power magnification (above) and one of high-power (below), illustrating the intimate union formed between the brass stud and tube by this process. It will be observed that there has been complete solution of the metals at the bond, traces of the joint having entirely disappeared.

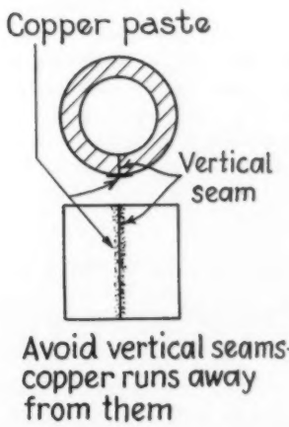


FIG. 58—Assemblies are generally set up in such a position within the brazing furnace so that there will be no vertical seams from which the brazing metal can run by force of gravity.

Clips for Inaccessible Joints

Inaccessible joints can sometimes be supplied with brazing metal by using clips made from copper strip or foil. The clips can be formed into odd shapes to fit odd contours. They give surprisingly good results on certain types of work. Use of clips on refrigerator evaporators was illustrated in Fig. 35, at *A* [IRON AGE of Sept. 22, page 48].

FIG. 59—A piece of copper foil melts and runs down the surface of the upper half-shell of this refrigerator float and collects at the mid seam, where a strong, tight bond is made.

Slugs of Brazing Metal are Handy

Slugs of brazing metal are commonly employed and they sometimes have advantages over rings. Slugs can be made from short, cut lengths of copper wire or strip. For a production job they can all contain the same amount of brazing metal, thus contributing to uniformity. In the refrigerator exhaust muffler, shown at *A* in Fig. 64, copper-wire slugs are dropped into place during assembly with greater ease than copper rings could be inserted. Thus, the applying of copper to the joints is of negligible cost because the time required for dropping the slugs in place is nil. At *B* is shown a copper slug placed on top of a tungsten-carbide bit being furnace-brazed to a steel shank. When the copper melts it flows over the entire bit and runs over the edges into the joint. In such assemblies the bits are generally held in position by

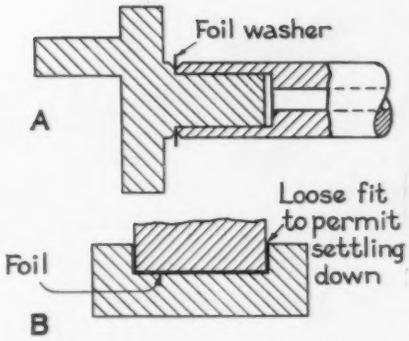


FIG. 60—Foil used as brazing metal. *A* shows a foil washer in the joint of a refrigerator crank. *B* suggests a loose fit to allow an upper member to settle down and take up voids.

tightly-wound chromium-iron alloy wire.

Fig. 65 shows a scheme sometimes used, whereby holes are drilled into the members and copper slugs are dropped into them when assembling, previous to furnace-brazing. It would be difficult to supply copper to these joints satisfactorily in any other way. Also by having the copper flow from the inside out, completion of the braze is indicated by the appearance of the copper fillet around the joint. For best results it is quite important that the abutting surfaces of these members be square, flat, and clean.

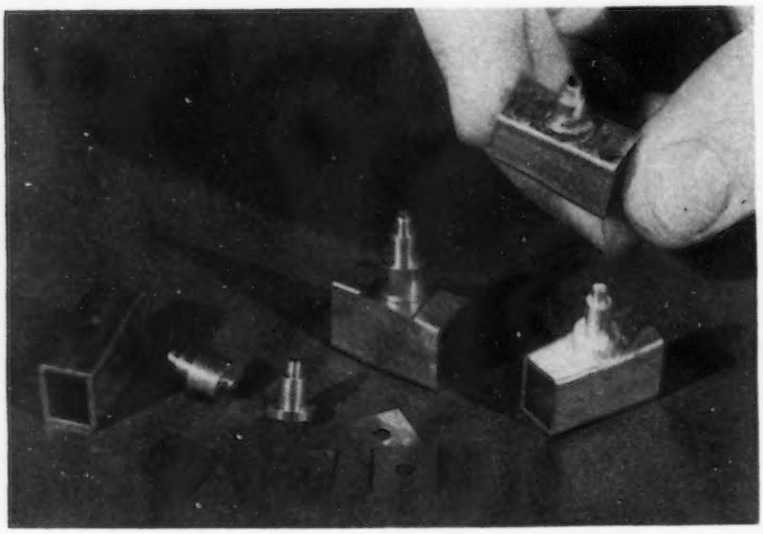
Slugs, as well as long lengths, can be cut from copper wire on machines such as made by the Artos Engineering Co., mentioned above.

Electroplating Also Useful

By electroplating the surfaces of members before assembly, some products can be furnace-brazed without further addition of brazing metal. A good example of this is the Bundyweld double-walled steel tubing shown in Fig. 35, *C*, [IRON AGE of Sept. 22, page 48]. To get successful results, with the plating serving as a sandwich filler, such as within a sleeve joint, the plating must be quite thin and the sections of the parts must be thin so that they can be quickly heated. With this combination, only a short time in the heat is required and the assemblies can be gotten out of the heat before the small amount of available brazing metal goes into solution with the steel and partially or completely disappears.

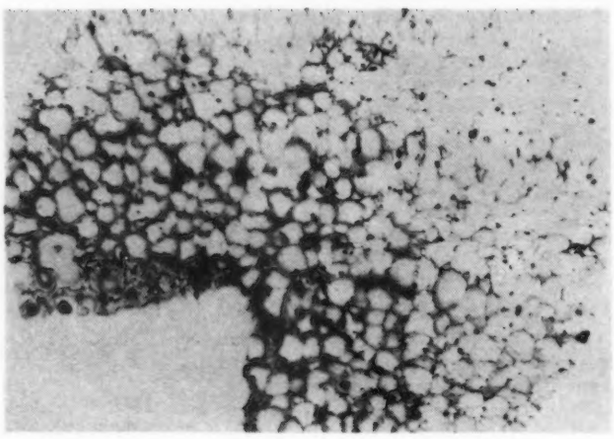
If there is a heavy layer of plating within the joint, the steel surfaces are held apart by this layer and they never have an opportunity to knit together and form as strong a bond as can be obtained if they are in intimate contact. Also, there is a possibility that

FIG. 61—This refrigerator crank was furnace brazed using a foil washer in the joint indicated by the arrow, in the manner shown at *A*, Fig. 60.



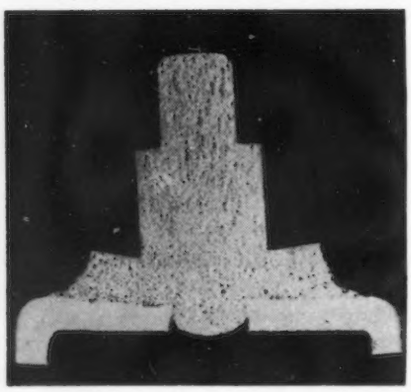
ABOVE

FIG. 62—A piece of Sil-Fos foil is inserted within the joint to furnace braze this brass stud and brass tube assembly. The assembly as brazed, then pickled is shown at the upper right, in hand; the final product, plated, is at the lower right.



ABOVE AND AT LEFT

FIG. 63—Photomicrograph of silver-brazed joint between the tenon and tube of the brass assembly shown in Fig. 62.



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when the copper melts, it will flow away, leaving voids which result in a weak or leaky joint. It has been shown, however, that some jobs can be worked out very successfully by means of electroplating if the proper combination is obtained. Sometimes copper in some other form, such as wire rings, is used to augment electroplating.

Fig. 66 shows an assembly in which electroplating is used to advantage to avoid the use of copper-wire rings. When this product, an automobile ignition switch made by Briggs & Stratton Co., Milwaukee, was first put into production, small copper-wire rings were placed over the tenons on the two pieces which are pressed into the cylindrical member. This proved to be slow because the rings were so small and hard to handle. Later, the cylindrical member was copper plated before assembly, and this plating supplied the brazing metal to the joints at a fraction of the former cost when using the rings.

Electroplating of the surfaces of high-carbon or carburized-steel members before brazing is sometimes desirable in order to minimize surface decarburization caused by the furnace atmosphere at the high temperature.

Molten Copper Sprayed on Parts

Copper or practically any other brazing metal can be sprayed in the molten state on assemblies preparatory to brazing, by use of an oxy-acetylene spray gun. In this device the copper wire is fed into the gun, melted with an oxy-acetylene flame, and blown upon the metal surfaces with considerable force. The brazing metal can be laid on in whatever thickness desired. It is necessary, however, to provide grit-blasted or sand-blasted surfaces on the parts so that the particles of brazing metal will be embedded in the surfaces. Otherwise there will be no mechanical bond and the layer might not adhere. An application of this method was shown in Fig. 26 [IRON AGE of Sept. 15, page 33].

Typical oxy-acetylene spray guns are the following: The Mogul Metallizer gun, made by the Metallizing Co. of America, Inc., 562 West Washington Boulevard, Chicago, and the Metalayer gun, made by the Metals Coating Co. of America, 495 North Third Street, Philadelphia.

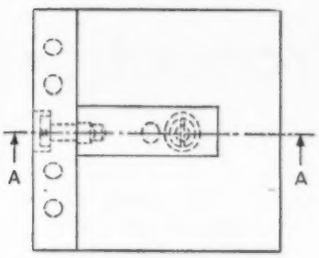
Copper Applied in Paste Form

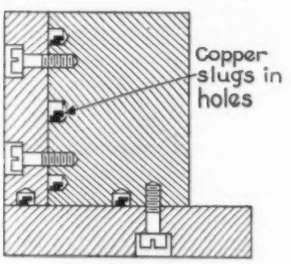
Copper-powder paste is a valuable tool in the furnace-brazing process. Its chief advantage is considered to be its ability to be applied in out-of-the-way places on assemblies where it is impossible to apply copper in wire or any other form. It is handy for preparing "underneath joints" where copper-wire rings cannot be made to stay in place because of their tendency to fall away. It is convenient to use

for fastening copper rings in place because it hardens so readily. Sometimes it is used as an auxiliary supply of brazing metal along with copper in some other form.

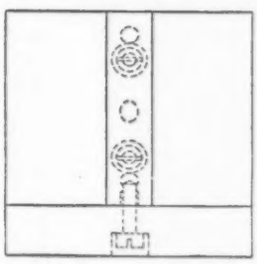
The copper paste is a mixture of pyroxylin solution, thinner, and copper powder, mixed to a suitable consistency so that it can be applied readily to the assemblies, usually with a small brush.

However, wire rings, foil, slugs, etc., are less expensive than paste and cost less to apply, so they are used wherever possible. Also, they are more desirable than paste from the standpoint of uniformity of amount. They can be inexpensively formed on a machine, and the quantity of copper obviously will be always the same. It is impracticable for an operator to apply the copper paste evenly or in equal amounts on all assemblies.





Section A-A

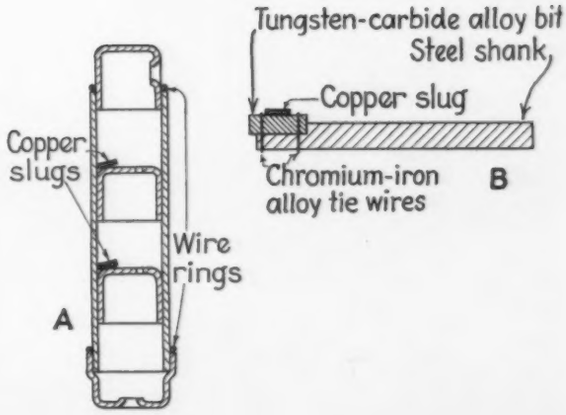


AT LEFT

FIG. 65—Embedding slugs of brazing metal in holes within joints is sometimes a convenient way to get metal where needed.

ABOVE

FIG. 66—Electroplating with copper the cylindrical member in the center avoids use of small wire rings on the two tenons and lowers preparation costs.



AT RIGHT

FIG. 64—Slugs of brazing metal are frequently used to advantage. *A* shows two slugs dropped into a refrigerator exhaust muffler; *B*, a slug on a tool to be tipped with tungsten-carbide.

Used to Hold Rings and Slugs in Place

Sometimes it is found that wire rings or slugs can be held in position nicely by a small quantity of the paste because it hardens quickly and forms a good binder. Otherwise, the rings or slugs might tend to slide away from the joints from handling the assemblies around the shop or when within the furnace. The paste generally contains copper powder when used for this purpose if it is desired to obtain the extra wetting action from the copper powder. Sometimes only the lacquer and thinner are used to cement the rings or slugs in place.

When employing a short-time brazing cycle in continuous and batch-type copper-brazing furnaces, the copper paste sometimes leaves an ash or carbonaceous deposit on the surface of the steel after brazing, which sometimes requires a stiff brush for removal. This deposit on the surface of the metal, in many cases, is not objectionable. But where appearance or cleanliness is a factor, the smooth even flow from copper in some solid form gives a much more desirable result than can be obtained with the copper paste.

When brazing with a long time-cycle, the deposit sometimes left on the assemblies by the paste will generally disappear and parts so prepared come from the furnace clean and bright.

The fact that copper can be applied in the paste form wherever necessary is one advantage of using copper as the brazing metal on steel assemblies, instead of using the lower-melting alloys. In brazing with alloys such as brass, a powder-paste is not so practicable because the low-melting constituents of the alloys, such as zinc, vaporize very rapidly from the powdered metal and it then becomes almost impossible to melt the brazing metal at anywhere near the supposed melting point.

In other words, when brazing with a paste made of brass powder, it is necessary to run the furnace at practically the same temperature as for copper brazing, and the results might not be nearly so good as when using copper. In addition, a flux is needed with the brass while none is ordinarily required for copper.

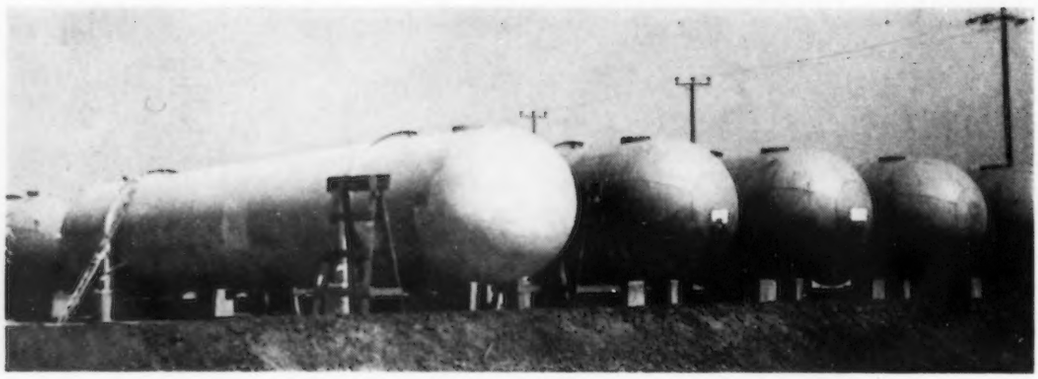
When brazing parent metals which are not easily wetted by the copper, such as cast-iron, or alloys containing chromium, manganese, vanadium, silicon, or aluminum, it is sometimes advantageous to mix a small amount of flux with the copper paste. The flux assists the copper to flow.

Paste Mixed in Small Containers

The copper-powder paste should be mixed in a small container, and should be stirred frequently to keep the powder in suspension and thus assure that copper is daubed on the assemblies along with the lacquer. A cover is desirable when not using the mixture, to retard the tendency to jell due to an oxidizing action with the air. Once the mixture jells or dries it cannot be restored and is reclaimed only at high cost, hence the desirability of small containers.

In general, the mixture consists of about one part each of pyroxylin solution and thinner, plus sufficient copper powder to give it a good consistency. With a little experience, the mixture can be made up by guessing at the proportions rather than taking the pains to make quantitative measurements.

(CONCLUDED ON PAGE 65)



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BUTANE tanks, 10 of them, now being metallized with zinc at Wilmington, Cal.

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Sprayed Zinc for Protection

By H. B. RICE

Manager, Process Development Department, Metallizing Co. of America, Inc., Los Angeles

o o o

ATMOSPHERIC corrosion is a major problem of modern industry. The application of zinc to iron and steel has provided adequate protection for ordinary weather conditions. The method most commonly used has been hot dipping, usually known as galvanizing. This process is satisfactory and economical but is limited to (1) size of items that may be treated in a molten bath of zinc, (2) maximum deposit of 0.0025 in. in thickness, (3) distortion caused by high temperature molten metal immersion and (4) necessity of re-dipping the entire object if any portion is defective. With these exceptions the zinc hot dipping process has provided good protection from atmospheric corrosion wherever the various types of paint have been inadequate.

Metal Spraying

There is another method of applying zinc that does not have the physical limitations of hot dipping, is restricted only by comparative costs, and has overcome this objection to a considerable extent. This process known as metallizing or metal spraying, employs an oxy-acetylene flame to melt zinc wire and a compressed air blast to atomize and impact the molten zinc particles to the surface to be coated. It seldom competes economically if galvanizing meets requirements, but with the single exception of cost it has practically no limitations as to application.

Coatings on plate areas may total 0.015 or 0.020 in. in thickness if desired, small or large structures regardless of form or size may be treated, no distortion from high temperatures is necessary, and any portion of an item may be sprayed. Bonds are approximately similar in efficiency on metals that may be hot dipped, but sprayed zinc may be satisfactorily applied and bonded to all metals. Quality of deposits are almost equal in corrosive resistance per unit of thickness according to the customary laboratory and field tests, although one contains a greater amount of zinc oxide while frequent dippings in molten zinc cause some ferrous inclusions in galvanizing.

The atmospheric corrosive field that cannot use the hot dip zinc process has predominately used paint or similar compositions often combined with pulverized metals. Such applications are low in initial cost but under some of the more active corrosive conditions protection is of short duration and average annual costs are comparatively high. Exposure to salt air, adjacent to large bodies of water, or low altitudes in tropical or semi-tropical locations invariably disintegrates the best of paint protectives in from one to three years.

In this field the use of pure molten zinc applied by metallizing indicates an economical and superior protection. European countries have used the process on bridges, upper vessel structures, and many other objects for the past 15 years. For this purpose British and German consumption of zinc wire is reported at 750 tons annually. Upper portions of the naval vessels of several Eastern countries are metallized. The SS "Normandie" has sprayed-zinc on its entire ventilating systems, refrigeration plants, fireproof bulkheads, and funnels. The initial cost is greater but much less per annum over a 10-year or greater period.

The subject application is coming into considerable use in the United States even though the shorter range viewpoint of economical expenditures is prevalent.

Employment of the process has been increased in this country due to major improvements in devices which permit use of metal wire of larger diameters to obtain several times the volume of deposit per hour, reducing the cost materially. As an example of the development of this application a Pacific Coast concern has kindly supplied data covering its experiences during the past seven years. This public utility manufactures and distributes natural gas and some other forms of hydrocarbon gas. Many structures of large area are in use that are subjected to salt air corrosion

ONE of three butane tanks being metallized with zinc at a Los Angeles fabricator's plant.

Against Atmospheric Corrosion

as they are located on ocean frontage or within a few miles therefrom. The customary forms of paint or composition protective methods have been wholly employed in the past. On ocean frontage exposures the best types of paint have seldom provided full protection for over two or three years.

Gas Holders Metallized by California Company

The use of metallized zinc by this concern has been confined to date to protecting the outside surfaces of high pressure gas holders. In February, 1930, a horizontal holder located adjacent to the ocean beach at Newport, Calif., was selected to make a field test to obtain an indication as to what might be expected from sprayed metal coatings. Approximately 150 sq. ft. of typical riveted plate and structural areas was coated with zinc and aluminum in thicknesses ranging from 0.005 to 0.015 in. The portions treated faced the ocean and had previously required the most frequent painting. Many inspections over a two-year period failed to disclose any failure. The results showed full protection and it was decided to use the thinnest specification of zinc to coat the entire outside surfaces of a vertical high pressure gas holder at Monrovia, Calif., to secure more data on procedures and costs. This job was completed early in 1932, the following information being obtained:

Cylindrical area	5579 sq. ft.
Hemispherical ends	3217 sq. ft.
Structural	880 sq. ft.
Total	9676 sq. ft.
Sand Blast Costs:	
Labor	517 hrs.
Compressor	87 hrs.
Sand (special silica at $4 per ton) (not sacked)	50 tons
Total sand blast cost per sq. ft.	$0.10623
Metallizing Costs: Including 1886 lb. of ⅛-in. and 12 B&S (0.081-in. dia.) zinc wire, oxygen, acetylene, labor, compressor and staging, cost per sq. ft.	$0.24773
Total time and material cost per square foot	$0.35396

It will be noted that approximately 1/5 lb. of zinc was used per sq. ft. to obtain estimated thickness of 0.003 to 0.004 in. The application was made in two coats. Unusual cost factors were: Necessary staging, extensive experiments to determine best devices, and inexperienced operators. An experiment was also conducted using the natural gas contained in the holder instead of acetylene for spraying.

Both the Newport and Monrovia holders have been in service for a sufficient period to form some conclusions. A few voids were observed where operators did not make the necessary effort to coat partially inaccessible areas. These were later taken care of but only totaled a few square feet. No depreciation of zinc deposits was evidenced on recent inspection. The coatings appeared to give complete protection and indicated an indefinite life. Failures of any type are obvious because iron oxide spots show up immediately.

Application Extended

In view of the satisfactory service record it was recently decided to extend the application to a number of newly constructed horizontal butane tanks, four of which were metallized in the plant of the fabricator at Los Angeles. Three of these, for installation at Santa Barbara, were 10 ft. 7⅜ in. O.D. by 68 ft. long at cylindrical sections, outside surface area 2700 sq. ft., each, operating pressure 167 lb. One for use at Wilmington had an outside area of 2500 sq. ft., and operating pressure of 125 lb. All four tanks are now in service near ocean fronts.

Heretofore similar structures were protected by painting. They were sand-blasted to remove mill scale and rust, and two coats of red lead primer and one coat of aluminum paint were applied. The average cost of this treatment totaled 11c. per sq. ft., including all labor and materials and the owner's usual overhead charge. This paint treatment has given reasonable protection near ocean fronts for two or three years but ordinarily after two years partial re-painting is necessary each succeeding year, requiring substantial expenditures thereafter. Also under this method some portions of the base metal are often attacked be-

fore additional paint may be conveniently applied, and therefore some depreciation of the plate occurs which reduces the total service life of the structure as compared with a positive protection over the entire area for a much longer period of time, probably equivalent to the entire useful service life of the tank.

The four butane tanks were metallized by using ⅛ lb. of ⅛ in. dia. zinc wire per sq. ft. of surface. Sand blasting was contracted at 5c. per sq. ft. by a concern in such business. Instead of using special silicia sand of high cost a good grade of clean, screened beach sand obtained satisfactory results. It should be noted that this type of sand is seldom satisfactory, however, for developing adequate bonds for metallizing. Only in case similar conditions exist may it be used. These are the spraying of zinc at not over 0.005 in. thickness upon new clean steel to serve as protection from atmospheric corrosion.

Time and Material Costs

The owner performed the spraying using two guns and following up the sand blasting within a maximum of five hours. Time and material costs were $0.12381 per sq. ft., including 60 per cent overhead on actual labor costs which amounted to 15 per cent on total time and material costs. Adding the contractor's sand blasting charge the total cost to the owner was $0.17381. If the entire application was contracted some 25 to 50 per cent would have to be added to provide a reasonable profit and possibly additional overhead costs. But as this would also apply if the painting specification was contracted the comparative cost ratios are similar. The owner has obtained almost seven years' service from similar zinc coatings without maintenance cost of any type, and has assumed a 40-year life for accounting estimate purposes.

The large difference in costs between the first holder sprayed in 1932 and the four sprayed recently is accounted for primarily as follows: No staging, lower cost of sand, experienced operators, no experimenting, and a considerable improvement in spraying equipment as applied to the recent holders metallized. Operators are now averaging over 30 lb. of zinc sprayed per hour (150 sq. ft. covered) over working day periods and obtain a denser and distinctly better quality of deposit than with the equipment used several years ago.

ABOVE

CLOSE-UP showing operators spraying zinc on butane tanks, using fan-spray nozzles.

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BELOW

SPRAYING zinc with a high-speed gun.

The same concern has begun the metallizing of nine additional butane holders which were recently constructed and installed at Wilmington, Calif. These are 10 ft. 7⅜ in O.D., by 59 ft. long on cylindrical sections, outside area 2500 sq. ft. each, operating pressure 125 lb. per sq. in. Approximately the same costs are anticipated as with the four butane holders recently sprayed as specifications and working conditions are similar.

There is, however, one situation that differs which probably affects working conditions and results most satisfactorily. Two of the nine butane tanks being treated are used as storage tanks or receivers for compressed air. A 500 cu. ft. compressor operates for a few hours each morning to fill these huge tanks to a pressure of 110 lb. The compressor is then shut down and all the necessary air for the use of two sand blast machines and two sprayers is provided from the two "air" tanks for the balance of the day. Obviously this condition eliminates all fluctuations, oil and moisture, and high temperatures and probably realizes the most ideal compressed air supply ever used by the process.

It is apparent that this concern will lower maintenance costs due to atmospheric corrosion by a substantial percentage. The corrosive condition is average for ordinary ocean-front exposure. Comparative paint and metallizing costs, as well as paint protective ratios, may vary with different conditions but the data presented indicate that the process may be used economically for the purpose described even though the cost may be several times that of paint where the latter fails to give full protection for more than two or three years. The cost of comparative protection is strictly an economic factor, but it seems reasonable to assume from the information presented that metallized zinc will prove to be an important aid in reducing the annual cost of atmospheric corrosion to industry.

New Unit Heater Designs and Other Plant Service Apparatus

By FRANK J. OLIVER
Associate Editor, The Iron Age

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FOR space heating mill buildings with large floor areas and extremely high ceilings, *Surface Combustion Co.*, Toledo, has developed a mammoth gas-fired unit heater, known as model F1250 SC, with a throw of approximately 175 ft. Total air delivery through the four outlets is 10,000 c.f.m., with an average temperature rise of 125 deg. and outlet velocity of 2500 f.p.m. The heater is designed to operate on manufactured, natural, butane or propane gas and the input is 1,250,000 B.t.u. per hr. The unit is of the floor type, only 3 ft. in width and 10 ft. 9 in. in length. A 7½-hp. motor drives the two air circulating fans and also the burner air fan, mounted on a common shaft.

ANOTHER large size unit heater for similar application is the Directherm line made by *Airtherm Mfg. Co.*, 1474 South Vandeventer Avenue, St. Louis. In brief it consists of a gas, oil or coal fired furnace, with heat extractor, multi-blade centrifugal fan and suitable outlets for directing the high velocity air stream. Through adjustable wide angle of delivery of the warmed air, the need of duct work is eliminated. These unit heaters are made in a wide range of sizes.

A NEW gas-fired unit heater, operating without steam or water, has also been added to the line of the *Automatic Gas Steam Radiator Co.*, 455 Brushton Avenue, Pittsburgh. The unit is suspended from the ceiling and employs natural or manufactured gas for fuel. It is available in five sizes, ranging in capacity from 85,000 to 200,000 B.t.u. per hr. Products of combustion are passed through a bank of tubes and air is passed around them by means of a motor-driven fan at the rear. A safety device turns off the gas if the pilot goes out or burns too low for ignition. Besides being used for space heating, these units may be adapted for ventilating, cooling and drying.

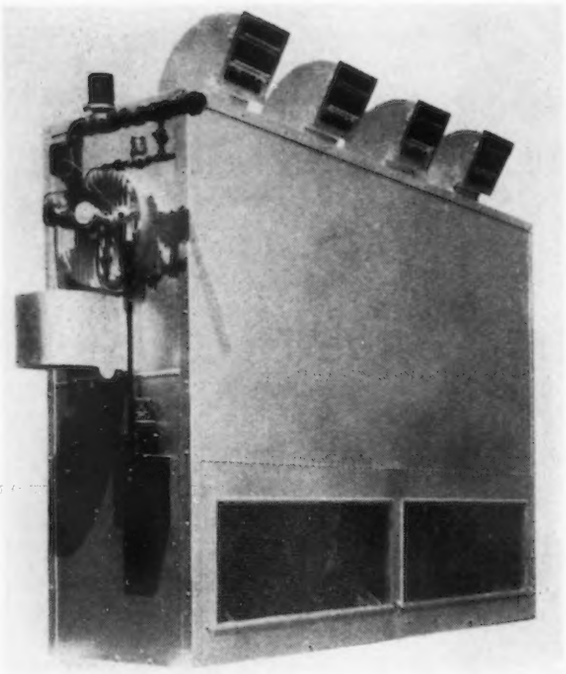
CARRIER CORP., of Syracuse, N. Y., is offering a similar line of gas-fired unit heaters in three sizes ranging from 70,000 to 210,000 B.t.u. per hr. capacity. In connection with this development, Carrier is marketing a gas-fired duct heater for use with a central fan air-conditioning system.

AN improved fin-type steam unit heater is the new line of model C Breezo-Fin heaters recently announced by the *Buffalo Forge Co.*, Buffalo. The casing is attractively "streamlined" to give eye-appeal. The heater element is a one-piece, seamless copper tube, with square copper fins. The motor-driven fans are furnished in five sizes from 12 to 24 in., and each size may be had with one or two-row coils, corresponding in equivalent direct radiation for 2-lb. steam pressure and 60-deg. entering air to a range of 125 to 1083 sq. ft. Detailed ratings may be found in bulletin No. 3137. Standard motors are used, from 1/40 to ¼ hp. in size.

FROM high capacity floor types capable of sending a blast of warm air 175 ft. down the shop, to small, ceiling-suspended fin types, seven different types of unit heaters are described as well as related fan equipment. A number of auxiliaries for compressed air service have been introduced in recent months. Other announcements of the suppliers reviewed includes valves for severe duty, plant maintenance equipment and supplies for floors and walls, also shop furniture.

MODERN art treatment with clean-cut lines has also been given the propeller fan type unit heaters announced by the *Herman Nelson Corp.*, Seventh Street, Moline, Ill. These space heaters are available in a range of 18 sizes for use with steam or hot water. Air capacities range from 275 to 5060 c.f.m. The heating element is in the form of red brass tubing designed with loops to take care of expansion, and a stay tube maintains proper relationship between headers. Motor may be had for single, two or three-speed operation. It and the fan assembly are mounted on steel arms designed to absorb torsional vibration.

CABINETS embellished with integral beading, new heating elements with double headers, new manifolds and improved full-floating mountings are found in the line of series 4 unit heaters announced by the *Fedders Mfg. Co.*, Buffalo, N. Y. This series comes in 25 sizes ranging in capacity from 75 to 1200 sq. ft. of equivalent direct radiation. Individual convoluted fins prevent expansion stresses between tubes and fins, and all surfaces are smooth to prevent pockets in the airstream. Motors are mounted in rubber to isolate vibration, and sound deadening fabric is used be-



ABOVE

THIS huge Surface Combustion direct gas-fired unit heater, with an output of 1,000,000 B.t.u. per hr., is intended for space heating of large factories and steel mills.

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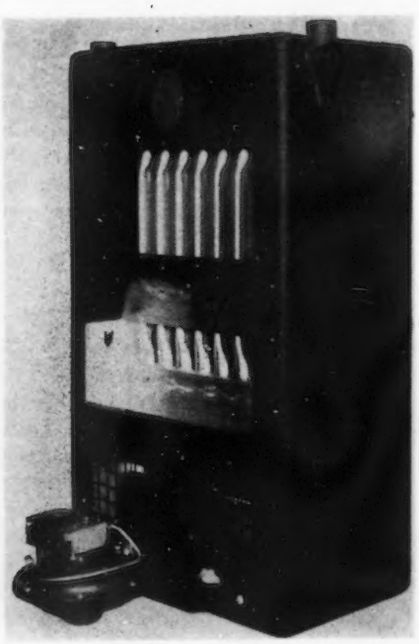
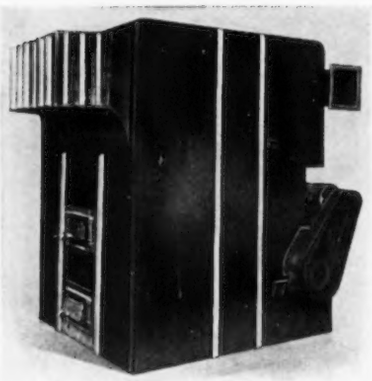


CARRIER gas-fired unit heaters are made in three sizes with ratings from 70,000 to 210,000 B.t.u. per hr. and with one to three 1/20-hp. motors, respectively. Heat exchanger tubes are chromium alloy steel.



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HAND or stoker fired coal, oil or gas can be used for the fuel in the Directherm (direct-fired) unit heaters particularly suitable for buildings that are heated intermittently, such as warehouses.

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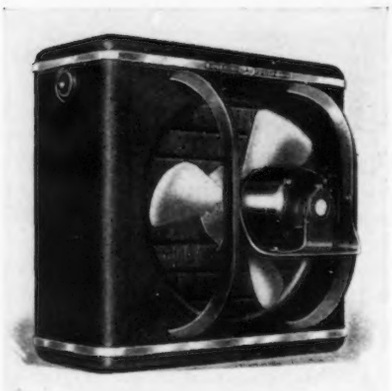
BELOW

THE new model C Buffalo Breezo-Fin unit heater with fin-type steam coils is attractively encased in the modern manner.



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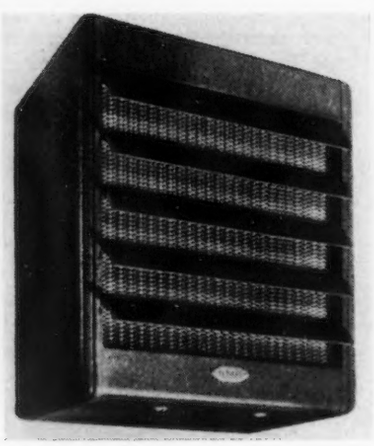

FEDDERS series 4 unit heaters are available in 25 models ranging in capacity from 75 to 1200 sq. ft. of equivalent direct radiation.

THE Herman Nelson propeller-fan type unit heater is designed for steam or hot water heating of all types of industrial plants.

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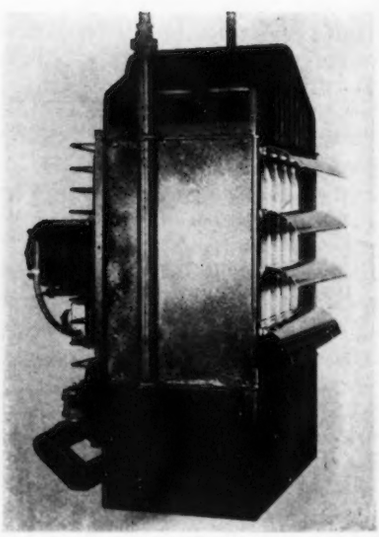

THE series 200 U Pittsburgh gas unit heater has an output of 160,000 B.t.u. per hr., equivalent to 690 sq. ft. of direct radiation. Fan blade is 20 in.; motor, ¼ hp.

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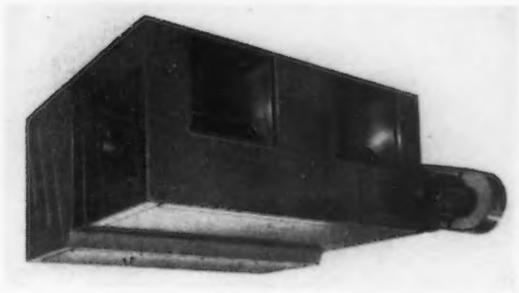

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ONE, two and three fan units for either vertical or horizontal air discharge and with or without filters, are being furnished by the Carrier Corp.

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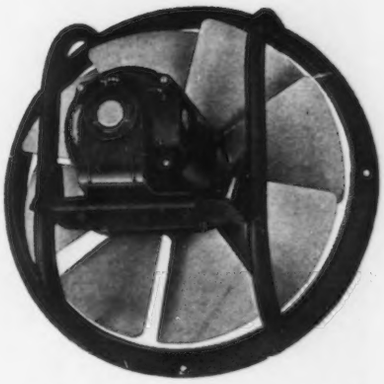

AIR-VENT fans are said to be ideal for duct work installation because they will not lose efficiency against reasonable back pressure. A heavy duty fan of simplified construction, built by the Airtherm Mfg. Co.

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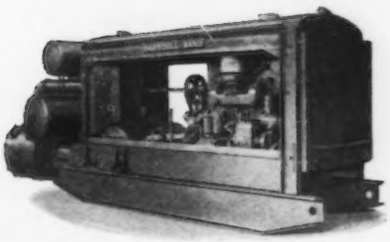
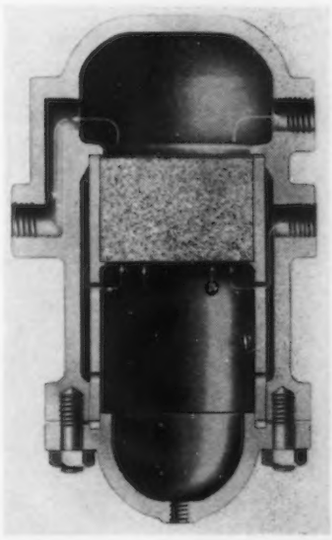


THE new Ingersoll-Rand model 425 heavy duty compressor shown mounted on steel skids for semi-portable service. It delivers 425 cu. ft. of air per min. at 100 lb. and is driven by a four-cylinder heavy duty tractor-type engine through reduction gears.

WORTHINGTON PUMP & MACHINERY CORP.'S latest type BB vertical direct-injection diesel engine. This is the No. 5 size of 150 hp. The complete line ranges from 60 to 180 hp. and from two to six cylinders. They are adaptable to pump, compressor and other power drives or to carry peak loads on the power line and can operate with continuous heavy duty loads.



BONDED aluminum oxide crystals are used as the filter element in the Fisher type No. 361 filter for gas and air lines.

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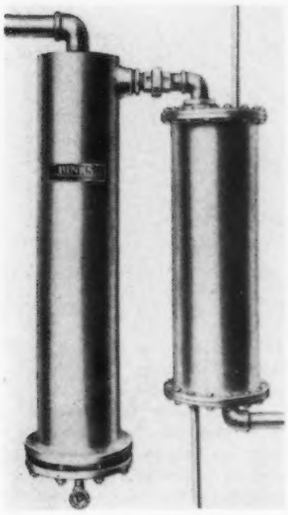
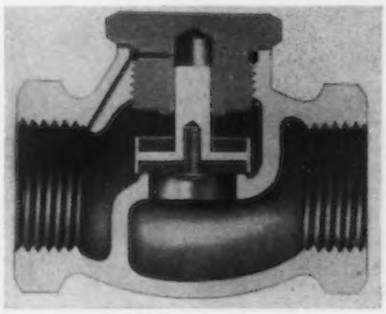
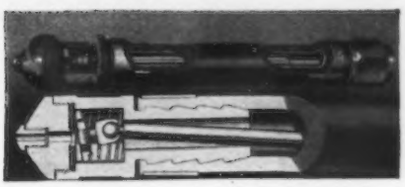
THE new Worthington balanced-angle V-type air and gas compressors for industrial service are available in a wide variety of arrangements and capacities. Electric motor driven tank or base mounted units with automatic start-and-stop control or constant speed unloaders are offered. Gasoline engine driven units also may be had, or the bare compressor can be supplied with crowned pulley for flat belt drive, although Worthington multi V-belt drive is generally used. The new units are known as VA and VA-2 compressors.



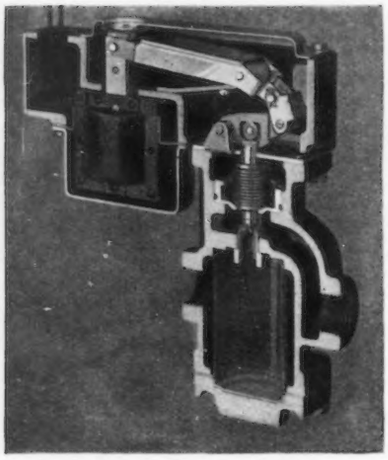
EXCESS moisture in compressed air lines can be removed in the Binks pre-cooler (right) shown used in conjunction with a No. 540 main line oil and water extractor.



IRRITATING noise and destruction due to valve hammer in air lines are said to be eliminated by a check valve made by C. A. Norgren Co., Inc., Denver. The moving valve is so constructed as to be held in the open position by the suction created above the valve stem by the flow of air past a small syphon jet hole in the valve body. When the compressor stops, the vacuum above the stem is broken and the valve returns to its seat without chatter. The disks are easily replaceable.



CONTROL of compressed air for jet blowing is obtained by the Air-O-Check valve unit, actuated by flexing the hose.



A SPRING-LOADED leverage system is utilized in a new solenoid operated water valve announced by McDonnell & Miller.

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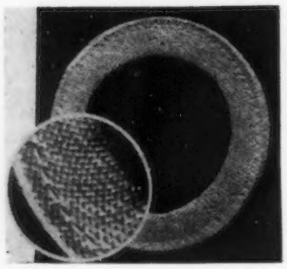
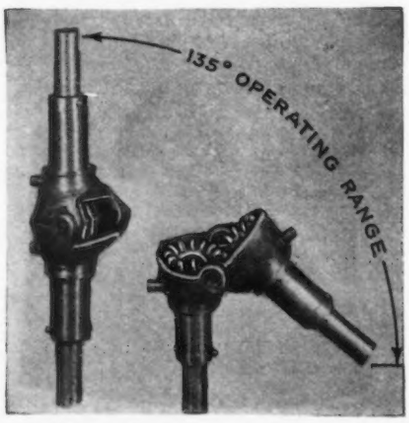
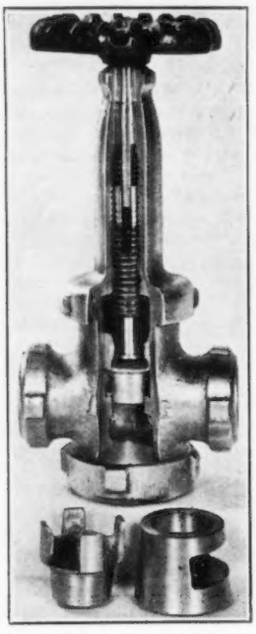


THIS woven glass fiber gasket is soft, pliable, resilient and resistant to all acids except hydroflouric acid. Packings made from this material have been used on centrifugal and reciprocating pumps, in place of blue asbestos. The manufacturer is the Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

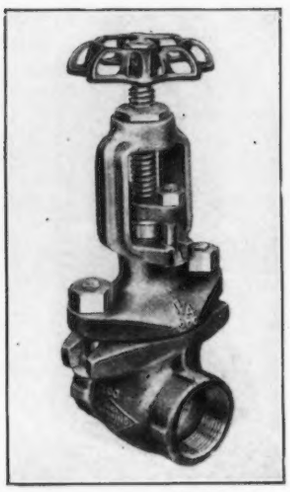


FOR valves difficult to reach or for any other remote control application, the universal bevel gear angular motion is offered by Condenser Service & Engineering Co., Inc., 310 Twelfth Street, Hoboken, N. J. The gears mesh accurately in any position between 45 and 180 deg., making the greatest angle of use 135 deg. Gears are steel, with cast steel guards and housings.

EXTENSION arms 6, 8 or 10 ft. in length can be attached to standard Thor No. 2 or 7 spray guns, made by Binks Mfg. Co., Chicago, for plant maintenance painting.



NO packing is required in the new Monat Packless T-globe valve for high temperature and pressure service.



JENKINS gate valve made of a copper-bearing 18-8 stainless steel having less than 0.10 per cent carbon for handling extremely corrosive liquids.

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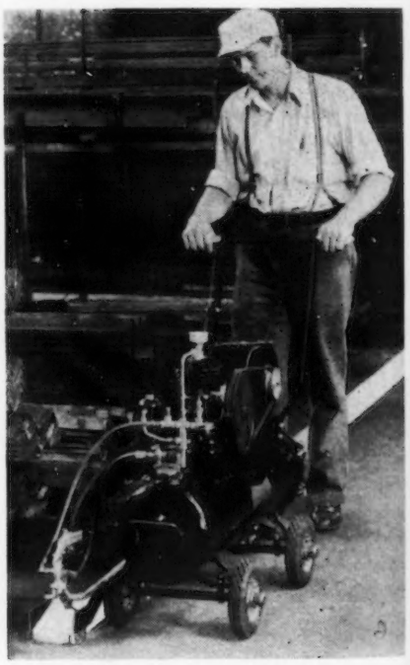
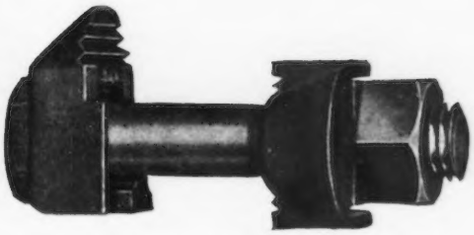
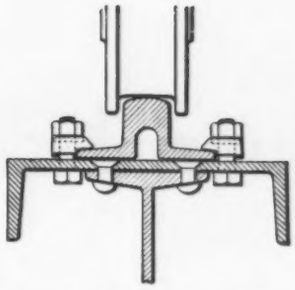


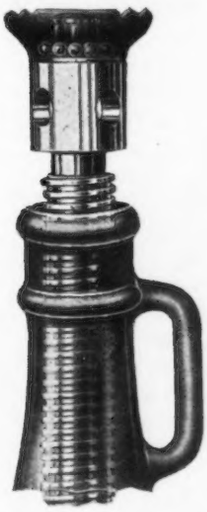
THIS line marking machine, made by Saylor-Beall Mfg. Co., Detroit, enables an inexperienced operator to lay down in an hour from two to four miles of clean-cut traffic lines, 2 to 6 in. wide, on factory floors. Dual spray attachment is available for painting parallel lines. When equipped with extra spray gun, cup and hose, the outfit is claimed to offer attractive possibilities in general maintenance work. Flow of material is regulated by operator through positive trigger control on the guiding handle.



THE Fanner safety hook bolt head, either with a single head or double as shown, and with or without a deep washer, is a fastening device for structural members.



IT is made for standard bolt sizes from ¾ to 1 in. The line cut shows an application for fastening a crane rail to steel main track girder without drilling the rail flanges.



AN improved line of jack screws in 38 sizes has been developed by the Duff-Norton Mfg. Co., Pittsburgh. Distinctive features include a one-piece base of high strength cast iron, steel screw with forged head, surmounted by an unbreakable drop-forged steel top, under which a full complement of chrome molybdenum steel balls are placed. The jacks conform to the Department of Commerce Simplified Practice as covered in report No. 97-30. Capacities run from 5 to 36 tons.

MODEL 8900 series card operated time recorder made by International Business Machines Corp., is especially designed for companies with small payrolls. The new model has no knobs, levers or plates to press or strike, but instead is trigger operated by insertion of the time card. The day-to-day change and the ribbon feed and reverse are automatic.

A REDESIGNED shop foreman's desk, 36 in. wide, 30 in. deep and 52 in. high overall, is offered by Lyon Metal Products, Inc., Aurora, Ill. It is 42 in. high at the front for convenient writing while in a standing position. Drawer slides on roller bearings.

MODEL 401 Acousti-Booth is suitable for telephone service in moderately noisy locations in factories, where space is limited. Model 301 is of cubical shape, somewhat larger in size, and can be bolted to a wall or pillar. As in the case of the floor type booths made by the Acoustic Division of Burgess Battery Co., Chicago, extraneous noise is absorbed by a special lining of perforated metal backed by a soft sound absorbent. Outside sheathing is steel.

tween casing and fan shroud to contribute to quiet operation.

Fan Units

FOR positive air circulation, supplying of filtered air or exhausting smoke or fumes, *Carrier Corp.*, Syracuse, is marketing one, two and three-fan units in six sizes for vertical or horizontal air discharge. They come with V-belt motor drives built into the unit and may be equipped with filter boxes and filters. When used with controls and heating coil, these unit fans may be used as recirculators and boosters for central air conditioning systems. Fans are double inlet centrifugal type, electrically welded. Fan wheels are mounted on ball bearings. Motor mountings are designed for sound and vibration absorption.

THE *Airtherm Mfg. Co.*, 1474 South Vandeventer Avenue, St. Louis, has also announced a line of Air-Vent heavy duty exhaust fans for general industrial use. Among the claims for the line are: low first cost consistent with quality; dependable long life; economy in power consumption; minimum maintenance cost, and ease of installation. Fully enclosed motors, with a special type of mounting, are used on all standard units, and pressure-proof fan blades are designed for minimum resistance to entering air. Explosion proof motors and aluminum blades can be supplied on all models.

Compressed Air Equipment

A NEW pre-cooler for the extraction of moisture from plant compressed air lines has been announced by the *Binks Mfg. Co.*, 3114 Carroll Avenue, Chicago. The inside of the shell, which is 15 in. o.d. by 36 in. long, is partially filled with air tubes so that the heated air goes through them and is cooled by the circulation of water around them at a minimum rate of 2 g.p.m. The condensed moisture is collected in a Binks No. 540 main line oil and water trap. The unit will take care of 200 cu. ft. of air per minute.

TYPES 360 and 361 filters for the removal of foreign matter and free moisture from air and gas pipe lines with a minimum of friction loss are offered by the *Fisher Governor Co.*, Marshalltown, Iowa. These filters utilize extremely hard aluminum oxide crystals bonded together as a cake. This filter element is both acid and heat resisting and is mechanically

(CONTINUED ON PAGE 45)

What Industrial Executives Think

From the President of A Cutting Tool Co.

WE feel that there is hope in the situation and that a measure of confidence has been restored. To that extent business will be somewhat better. We feel it in our business but not to the extent we had hoped for.

To sum up this whole matter, we look for a reasonable betterment in business, and believe that businessmen will proceed a little more bravely than they have done in the last year and a half or two years in so far as they can safely do so without endangering their credit position.

From the General Manager Of a Pipe Tool Co.

THE election of November 8th appears to indicate that the American people are getting fed up on experiments and are anxious to return to the proven methods which have made this country what it is.

This being the case, we would naturally expect to find confidence increasing on the part of businessmen and a greater willingness to go ahead with expansion, new plans and new products which have been temporarily held up. We are optimistic regarding the future.

From the Vice-President of A Metal Stamping Co.

THE opinion of our individual plant and its executives relative to the business effects of the recent elections is as follows:

We think that the election expresses universal disapproval of existence without jobs; by this we mean that WPA work, in the minds of the majority, is not a job.

We believe that industry, as a whole, is being recognized as the only means of producing industrial jobs. We believe also that agriculture is looking forward to improvement over the past and that if Congress will substantiate these opinions by objecting to further controls of items mentioned, business will steadily improve.

From the President of a Metals Equipment Engineering Co.

AS far as the writer personally is concerned, he believes that the election will result in an immediate improvement in business; but he is very sorry to say that he does not think business will be very good as long as Franklin D. Roosevelt occupies his present position.

From the President of a Machine Tool Building Concern

I BELIEVE that the recent election means that the people do not want a collectivistic government; that they are tired of extravagance and corruption and they are going to get a different class of public servants in office. If they carry out that resolve, business eventually will be better.

Certainly the election cannot fail to help any economic recovery under way, but I cannot make any predictions as to the extent of that help.

From the President of a Material Handling Equipment Co.

THE results are gratifying and especially to us here in Wisconsin. It clearly indicates that the voters will change their "mandate" when, after a fair trial, deceptive political promises and fantastic idealistic schemes fail to materialize.

Unquestionably, the results give greater confidence to business, yet business cannot proceed with complete confidence until the trend back toward saner thinking will carry far enough to insure: first, a national administration after 1940 that will administer fair and equal justice to all citizens irrespective of class or occupation, and second, one that will adhere to recognized economic laws in conducting the affairs of the nation.

We believe the basis for that real confidence is on the way, and we are hoping that the next Congress will "give government back to the people."

From the Vice-President of A Metal Specialties Co.

IT is difficult to view the National politics objectively, especially if one is engaged in industry, because I think the wish of everybody in industry is so definitely for the downfall of the present regime that I am afraid we make the wish be father to the thought and our opinions are apt to be swayed by emotion rather than logic.

Discounting that, however, as well as I can, I think there is a definite trend toward the right and I believe it will continue. Of course, it is somewhat the same situation as locking the stable after the horse has been stolen, because if you want my honest opinion, I think this country is bankrupt. Disregarding our appalling debt, we have squandered our largest natural resource—by that I mean the moral fiber of the people. We have educated millions that the world owes them a living. Whether it be for raking up leaves or abstaining from planting cotton and corn, the fact remains that perhaps one-third of the total population is firmly of the belief that the less work they do, in general, the better off they will be. It is going to take generations to get over that. I don't know if we can do it, but I am trying to do my part.

From the President of a Mold and Iron Co.

I BELIEVE that the result of the recent State elections will produce more confidence with investors and business men. It should show New Deal officials that they have imposed too many restrictions with reform legislation and that modifications at least must be made. If these New Deal officials are unwilling to recognize this mandate from the people, the legislators themselves will do so and the net result will be a turn to the right. We cannot hope for drastic tax reduction in a short time but a tendency in that direction should be the signal for increasing confidence which will make the wheels of industry turn faster.

the Elections Will Mean to Business

From a Manufacturer Of Piano Actions

IT is my opinion that the recent State elections will have a decidedly stimulating effect upon business. This, however, will not show its full effect until after Congress has met and the temper of the Congress tested with some New Deal legislation such as amending the Wagner Act. If the new Congress shows that it is doing its own thinking and will not be dictated to, then I feel that we may go to work with confidence. Certainly the investor will once more come into the market if there are definite signs of a conservative Government ahead.

From the President of a Large Machine Works

I AM very much pleased with the recent State elections as it indicates a conservative trend among our voters.

These elections will certainly encourage business and I also think tend to moderate the extremes of legislation which either have been enacted or proposed recently in our Congress. The only thing the business world needs today is confidence—particularly in capital goods industry—and I think the tendency today is going to be for much better feeling throughout the business world.

From the President of a Railway Equipment Co.

I FEEL that the vote on last election day clearly indicated that the rank and file of our country have come to the conclusion that guessing and experimenting is not the way to cure our troubles. Therefore, regardless of party, they have elected to office those whom they feel will adopt a more safe and sound attitude when it comes time to enact necessary legislation that will be of help in getting us out of the rut.

Business leaders and investors should regain much confidence because of this expression on the part of the people.

From the President of A Car Wheel Concern

THE free exchange of goods and services rests as much upon a condition of mind as upon governmental control. While the results of the recent elections undoubtedly will have a far-reaching effect in dispelling much of the pessimism which has existed in the minds of a large proportion of our citizenry, it will undoubtedly increase the effect of the differences of opinion as to the functions of government among groups and classes.

It seems reasonable to suppose that some stimulation to business will result from less drastic governmental interference, which seems probable because of a more even division of power in the central government, but unwise to look for any rapid or drastic change until many of the serious problems of taxation, relief, social control, etc., are more definitely dealt with.

We look for a moderate improvement in buyer confidence which should gain momentum as the future policies of government become increasingly clear.

From the President of a Drop Forging Co.

THE results of the recent State elections can but be most gratifying and heartening to the business man who for more than six years has been depressed, harassed and oppressed by the unwarranted attacks on business, by pusillanimous pip squeaks in Washington and in many of the State Capitols.

Now that more than eighty of these spineless invertebrates have been replaced by upstanding and understanding representatives who will lend a sympathetic ear to an honest manufacturer, and I believe an overwhelming majority of them are honest, we can reasonably hope for and expect a return of confidence and a general improvement in business and in the affairs of the nation.

From the President of a Conveyor Mfg. Co.

WE are definitely of the opinion that recent election results will have—in fact, already have had—an effect upon the buying policies of our customers. The industries which we serve are those which have been planning for some time expansion or improvements involving special heavy bulk handling equipment, and are the type of customers who necessarily must plan in the future rather than for immediate needs. We are definitely optimistic for the near future.

From the President of a Metallurgical Engineering Concern

DURING the period of the election I happened to be in Chicago and was traveling over on the train from Chicago to Detroit that night and observed the number of happy smiles on the faces of the various people with whom I came in contact and did not find one person who objected to the trend shown by the present election.

As far as I am concerned it is about time that we had a return to a more sane government inasmuch as we cannot spend all of our dollars in one period, build up a national debt, when we have all the resources and ingenuity necessary to prevent such a cycle.

From the President of a Forging and Heat-Treating Co.

I SHARE the almost universal belief that the implications of the election results are decidedly favorable. There is certainly every indication of a definite and substantial increase in the confidence with which business men are looking to the future.

It seems to me that there are certain dangers in the situation which should be guarded against. I find a tendency in some quarters to be unduly optimistic and to consider that we are "out of the woods," where as

a matter of fact—we have still a long way to go before the economic and political conditions of the country will be even reasonably satisfactory from a business point of view.

Further, I believe that business has a heavy responsibility in conducting itself so that it will not be vulnerable to political attack.

To sum up, conditions and prospects are certainly much improved, but there are still many unfavorable factors to be overcome.

From the President of a Forge and Blower Co.

OF course, the recent State election has been accepted very enthusiastically and optimistically by industry and although it is too soon to see any effect upon business, it should cause some considerable improvement and with, I trust, a better real stability. Anyway, it looks as though industry may begin to have another chance.

From the President of an Alloy and Tool Steel Co.

IT is my opinion that the recession in business which came in the fall of 1937 was due to a very large extent to the epidemic of sit-down strikes throughout the Middle West that summer, and I am certain that with a return of confidence that Government will protect property rights, we can expect a gradual steady improvement in business for some time in the future.

From the President of a Crane and Shovel Mfg. Co.

IT appears to me there is a considerably better feeling among business men since the last election.

We have more good definite inquiries on hand at present upon which to estimate than we have had for a long time past.

From a Manufacturer of Anti-Friction Bearings

THE results of the election were very agreeable to those who have the interest of America at heart and not the least of the causes for happiness was the discovery that we were still able to have elections in which the electorate dared to disagree with the ruling powers.

Without question, the results of the election brought an increase in confidence which should make for more normal business with an eventual decrease in unemployment. There is, however, a very grave danger that as a result of the election we may so relax our vigilance and become overconfident through having won a battle, that we may yet lose the war.

From the President of a Hand Tool Mfg. Co.

UNDOUBTEDLY the result of the election in Pennsylvania will have a greatly reassuring effect on employers and business generally. Perhaps its greatest reassurance is to employers as clear evidence that the working people have learned that the pictures painted by John L. Lewis are dreams that cannot be realized and are rebelling against being forced to pay tribute to his organizers in order to hold their jobs. If I were running for office, I would promise a square deal for all. I would protect the man who wants to work against coercion and intimidation and discrimination from those who try to levy tribute on his right to work, as well as protect him against intimidation, discrimination or coercion on the part of his employer for any kind of collective action he may voluntarily choose to indulge in within the law.

From the President of a Non-Ferrous Metals Co.

FOR years private enterprise and the spirit of private enterprise have been drying up because of the growing power of the left wing of American public opinion. The recent election conclusively shows a definite check to this left wing development. The spirit of private enterprise will be correspondingly encouraged, and economic progress should again be resumed.

As a result the building of homes, factories, and plants, which has been dormant for many years, should now show an increase. Investors should be willing to provide industry with funds for modernization, expansion of their plants and for entrepeneurs.

From the President of a Heating and Ventilating Apparatus Concern

THE recent elections indicate that public opinion is becoming convinced that executions of Governmental policies the last few years will not result in a prosperous, happy condition for the people as a whole.

It would further appear that there is not serious disagreement with many of the attempted reforms, and benefits to the majority, but that the public is definitely troubled as to the manner in which these have been carried out. And they cannot avoid the feeling that there has been a great deal of abuse, unnecessary debt incurred for reform efforts being used for political expediency.

This has all resulted in the lack of confidence, not only on the part of the employer, but it has also now permeated to the employee. What else could be expected, when there are about the same number of unemployed today as there were when these reforms had their beginning?

The recent elections are restoring the confidence that has been so sadly lacking, and it will and should result in an appreciable improvement in business, which is already beginning to be noticeable.

From the President of an Electrical Tool Mfg. Co.

THE recent election, considered nationally, marked a definite trend back toward economic sanity on the part of American people.

It again proves that Abraham Lincoln was right when he said, "You cannot fool all of the people all the time."

For the above reasons it seems to me that business should gradually improve from here on.

From the General Manager Of an Automobile Appliance Co.

I HAPPENED to be in New York the day after election and during the following week. Naturally, the election was the topic of conversation at the various meetings which I attended and no one seemed to feel that there was going to be any abrupt change. The results of the election were anticipated to the extent that the results were not a shock even though they were more decisive than expected. The attitude seems to be that liberalism is demanded of both parties and excessive liberalism or excessive conservatism will not be tolerated from either party.

Probably the most important thing that can be accomplished to the bene-

fit of industry is to revise the personnel of the National Labor Relations Board in such a manner as to carry out the broad purposes of the Wagner Act and at the same time give the employer a fair hearing and provide the employer with a Mediation Board similar to that provided by the Railway Mediation Act.

Even people of substantial means seem to place more emphasis on the possibilities of less interference with business than on any possibilities of tax reduction.

From the General Manager Of a Nut and Bolt Works

SO far as our company is concerned, we feel that business will take a definite uptrend in the early part of the first quarter of next year; and in order to show how our feelings run in the matter, we have placed an order within the past few days for some new machinery.

From the President of an Electrical Power Transmission Equipment Co.

WE think the election is good. We think that this is just the first step.

That to obtain the results really needed lots of work by everyone must be kept going.

We believe it is only a straw in the wind as yet but a good indication.

From the President of an Instrument Making Concern

THE political gains of the present party in New England that promises to be friendly to business is enheartening. However, the fight is not over. The gains that have been made to overcome the destructive starry-eyed gentry of Washington should be securely held by concerted action on the part of those who made this victory possible and to continue the fight. We can have both the benefits of the ideals of the New Deal and better conditions for business which go hand in hand.

Now, let these men of action who have made this splendid fight continue, consolidate their gains and look forward to a victory in 1940 under the party that will mend the wounds in business, regain the confidence of labor and make us once more a happy national family without the present restrictive laws.

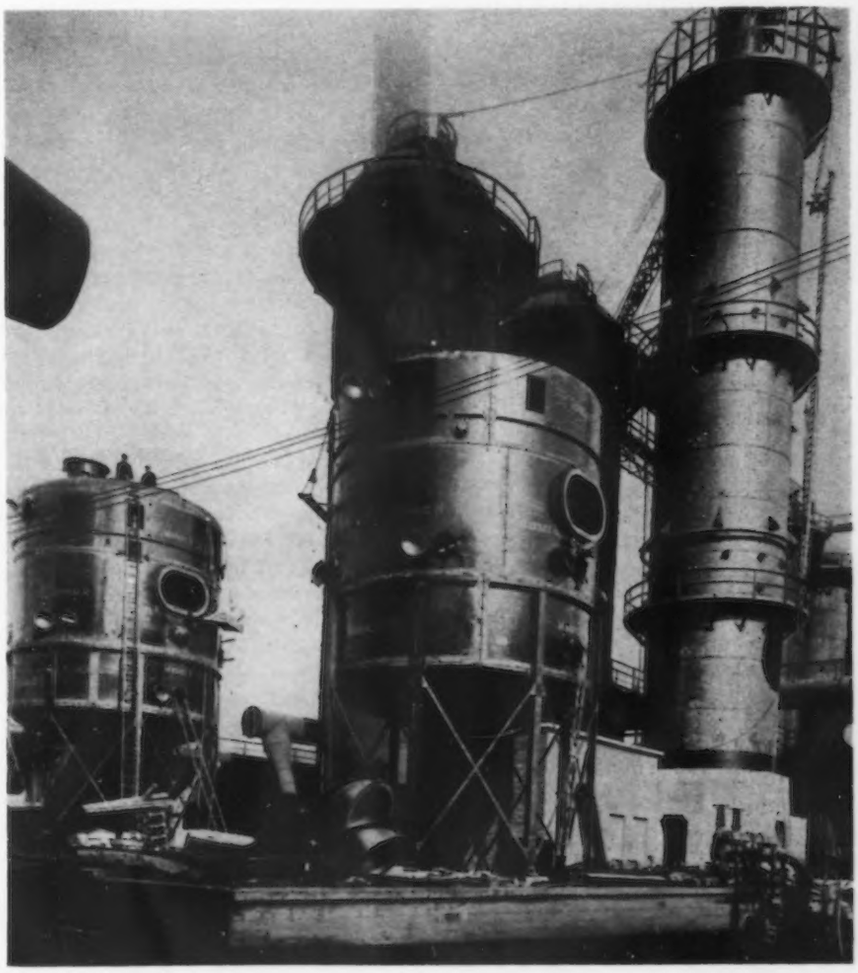
Mayari Steel Used by Bethlehem Steel For One of Its Own Projects

TAKING a dose of its own medicine, the Bethlehem Steel Co. has used its Mayari R low-alloy type steel in the construction of a scrubbing tower and two electric precipitators for the cleaning of blast furnace gases. Weight reduction and longer life because of the steel's resistance to atmospheric corrosion will offset the slightly higher cost, according to the company.

The scrubbing tower was constructed of ⅜-in. and 5/16-in. plate, replacing mild steel of ½ in. and ¼ in. thickness. A weight reduction of 38,000 lb., or 22.2 per cent, from 171,000 lb. to 133,000 lb., was attained. The two precipitator shells were made from 5/16-in. plate instead of ⅜-in., as formerly used. This resulted in a weight reduction of 8500 lb. for each precipitator, from 51,000 lb. to 42,500 lb., or 16.7 per cent.

No difficulties, it is said, were experienced in fabrication in spite of the greater strength of the material. In welding, flame cutting and drilling there was a noticeable difference from ordinary mild steel. The greater toughness and hardness made itself somewhat felt in shearing, bending, and punching, and particularly in chipping and calking operations. However, the difference was not enough to cause any increase in fabricating costs.

Mayari R steel has a tensile strength of 70,000 lb. per sq. in. and a yield point of 50,000 lb. per sq. in. Resistance to atmospheric corrosion has been shown by tests to be five to six times greater than that of ordinary mild steel. The chemical analysis is 0.12 max. carbon, 0.5-1.0 manganese, 0.08-0.12 phosphorus, 0.05 to 0.5 silicon, 0.2-1.0 chromium, 0.25-0.75 nickel, 0.5-0.7 copper.



THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

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. . . Union officials cool to General Motors wage security plan . . . Automobile production 96,735 units in week, but still lagging behind sales . . . Auto body methods entering new phase.

DETROIT. — Officials of the United Automobile Workers were cool to the wage security plan announced last week by Alfred P. Sloan, Jr., chairman of the board of General Motors Corp., which will affect 150,000 employees. (See THE IRON AGE, Nov. 17, page 77.) The announcement came on the eve of conferences opening the negotiations for revision of the UAW contract with General Motors.

Elmer Dowell, director of the union's G.M. units, said merely that the union was going ahead with its plan to seek a modified check-off system in General Motors plants and to change the grievance procedure to speed up the handling of union complaints. Homer Martin was wary of committing himself, saying only "I do not know enough about the plan to compliment or criticize it at this time. I am very much interested in an annual wage plan, but not in an annual loan." Only one union spokesman, Wyndham Mortimer, vice-president, openly opposed the plan, declaring that it is entirely inadequate "because it appears that it guarantees only 60 per cent of the base rate, and that is not sufficient."

Revelation of the General Motors' plan has revived the story that Ford is waiting the opportune time to announce an annual yearly wage plan. If Ford actually is considering such a plan, the General Motors announcement may tend to speed action on it.

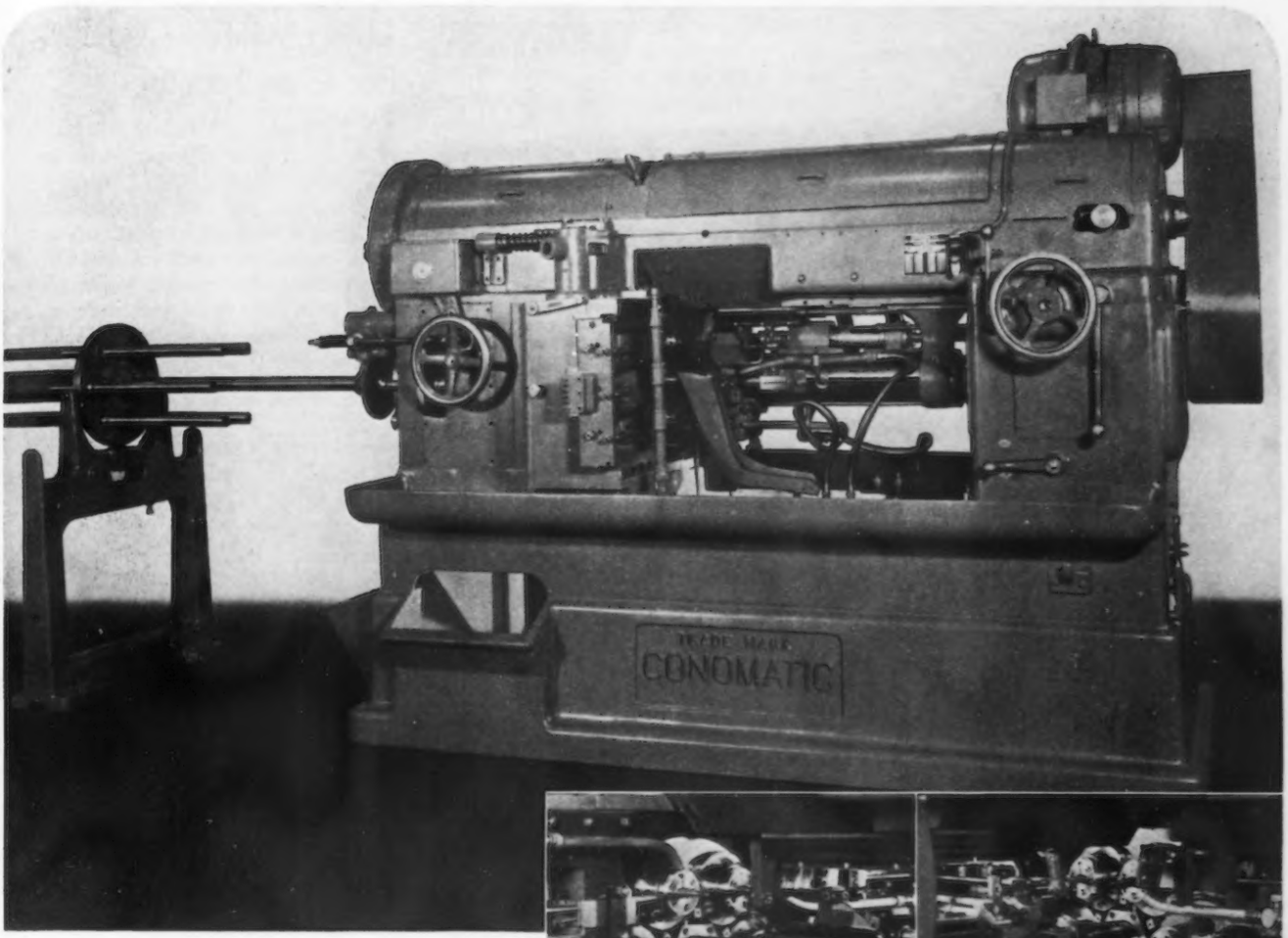
Executives of other companies, cognizant of the possible widespread effects of the General Motors' announcement, were weighing the costs of maintaining the system against the possible results. It has been pointed out by some of these executives that General Motors has already gone a long way toward minimizing plant shutdowns and unemployment during the model changeover season. In recent years there has been virtually no complete shutdown during the retooling period because various parts of the plant operated on carefully planned schedules—the shutdowns that have taken place have been "departmentalized" and in many cases lasted only a few days, or a week at the most. The reduction in these seasonal layoffs almost indicates a possibility of eliminating them altogether, because the small groups that are taken off their regular jobs by "departmentalized" change-over and retooling might easily be put to work in some other part of the plant doing work directly connected with the change-over. This is not entirely a dream, the records show.

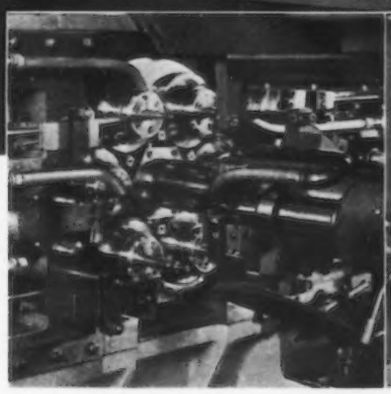
If the cost of the loan plan is an incentive toward making it less necessary—by reducing seasonal unemployment still further—the result will be beneficial to the employers as well as to the employees. Of course, Mr. Sloan's major emphasis is undoubtedly on the idea of sustaining purchasing power for the automobile workers during periods of slack employment. Whether the plan will bear the brunt of major economic moves in a downward direction is the important question which time will settle.

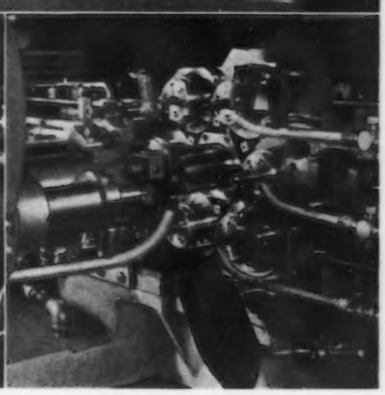
Sales Are Gaining

New passenger car sales, which in the first 10 days of November were reported 43 per cent ahead of sales in the same period of October, gained additional impetus from the series of automobile shows which were open last week all over the country. Although automobile and truck output moved upward last week for the ninth consecutive week, it is reliably reported that production is not keeping pace with orders which are piling up at some automobile plants. Field stocks are reported to be definitely below normal in the face of the swelling tide of sales. Output last week was 96,735 units, according to Ward's Automotive Reports. The figure represented a 10,000 gain over the previous week's total of 86,300 and is higher than last year's 85,757 for the corresponding period.

Chrysler led in the production gains, going on a five-day operating schedule to complete 24,950 cars and trucks, against 20,500 in the previous week. The Plymouth division's 13,500 was a record for the year. Ford turned out 15,500 Fords and Mercurys and 1475 Zephyrs, a good increase over the previous week's total of 13,450 for all of the Ford plants. General Motors also showed a gain, producing 44,250 units compared with







PRODUCING STEEL SCREW BLANKS

on the

New 6-Spindle Conomatic

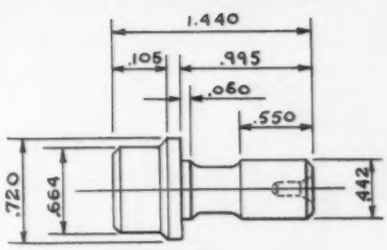
2 PIECES-10 SECONDS

Reports on the new 6-Spindle Conomatic show that the many new features built into this machine are the answer to a shop man's prayer. These features include:

- **Open end gearing which reduces the time necessary to place attachments in operation.**
- **Power feed which may be engaged instantaneously from either side of the machine.**
- **Power feed reverse for decreasing tool-up time.**
- **Increased facilities for multiple tooling.**
- **Reduction of maintenance.**
- **Quiet operation.**

The machine and tooling, shown above, are used to produce screw blanks from steel bar stock. Enough material is fed out in the first position to produce two finished screw blanks. .002" limits are specified for a majority of the diameters and lengths.

The 1¼" 6-Spindle Conomatic produces two screw blanks in 10 seconds! This is an hourly production of 522 pieces!



PART—SCREW BLANK

LIMITS—.002"

2 PIECES IN ONE CYCLE

2 PIECES—10 SECONDS

HOURLY PRODUCTION (80% of net)—522

Complete specifications on the new 6-Spindle Conomatic will be sent on request.

Cone Automatic Machine Co. Inc., Windsor, Vermont, U. S. A.

42,089 the week before. Chevrolet gained 1000 to 26,000.

New Method for Body Work

The production of automobile bodies by Briggs has been modernized with the recent installation of a new conveyor type assembly line for bodies. Ordinarily various body units are assembled in stationary jigs and then fused into a single body assembly after sub-assemblies are mounted in a larger stationary jig. In the new set-up, it is understood that $560,000 was spent on a system of conveyors and huge jigs so all of the body parts can be assembled on a moving jig. The weight of the huge jigs for the complete body is indicated by the fact that the building which houses this equipment on an upper floor had to be reinforced.

A rather startling concept of the proper way to build automobile bodies will be seen before long in operation at the Ford Rouge plant. The new pressed metal building, which covers about 64 acres, is much more than just a stamping plant. A view from the air illustrates the point made by a spokesman who said that Ford soon will have a body building system "from the ore to the finished, painted body." To the south of the Rouge plant is the canal slip from the River Rouge which has, on its right, huge coal and ore storage bins, coke ovens, blast furnaces and the foundry. To the left, in a straight line running from south to north, are open hearth furnaces, rolling mills, and the spring and upset and pressed steel buildings (stamping and body plant). To the right of this latter group is the glass plant and the soy bean plant where moldings are prepared. As conceived by Ford, this layout permits almost a straight line production from raw material to the finished bodies, ready for wheels.

Cars Average 4 Per Cent Lower

The Automobile Manufacturers Association points out that the buying public will pay on the average 4 per cent less for the cars in 1939 than a year ago. This reduction is calculated on the average price of all makes exhibited at the Auto Show, including the high priced cars with the low priced cars in the same proportion that the public bought them last year.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

U. S. Awards Orders For Gun Forgings

WASHINGTON.—Purchases of iron and steel products under the Walsh-Healey Act during the week ended Nov. 12 aggregated $4,590,278 while transportation equipment purchases amounted to $677,648 and machinery contracts were $868,695. Details of purchases in these and related groups follow:

IRON, STEEL AND THEIR PRODUCTS:

Bethlehem Steel Co., Bethlehem, Pa., Navy, Ordnance, gun forgings	$2,134,034
Bethlehem Steel Co., Bethlehem, Pa., Navy, Ordnance, gun forgings	163,629
National Forge & Ordnance Co., Irvine, Pa., Navy, Ordnance, gun forgings	118,348
Midvale Co., Philadelphia, Navy, Ordnance, gun forgings	2,094,514
The Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio, Navy, S&A, steel	15,890
The Youngstown Sheet & Tube Co., Youngstown, War, Air Corps, sheet iron	12,234
Lakeside Bridge & Steel Co., Milwaukee, TVA, structural steel	11,800
International Derrick & Equipment Co., Columbus, Ohio, TVA, structural steel	16,788
Koppers Co., Bartlett Hayward Div., Baltimore, TVA, emergency gate	11,800
Stewart Hartshorn & Co., New York, Philadelphia Navy Yard, rod, tie	11,238

NONFERROUS METALS AND ALLOYS:

Aluminum Co. of America, Washington, War, Ordnance, aluminum strips, bars, rivets, etc.	10,410
Aluminum Co. of America, Washington, Philadelphia Navy Yard, aluminum alloy	19,017

OTHER MACHINERY:

The Falk Corp., Milwaukee, Navy, S&A, gears	771,540
Bay City Shovels, Inc., Bay City, Mich., Interior, dragline exacavator	11,450
Schutte & Koerting Co., Philadelphia, Navy, S&A, pumps	14,089
Northern Pump Co., Minneapolis, Navy, S&A, pumps	23,149
Diamond Iron Works, Inc., Mahr Mfg. Co., Div., Minneapolis, Farm Security Adm., rock crushing plants	31,831
Caterpillar Tractor Co., Peoria, Ill., War, Engineers, tractors	16,596

ELECTRICAL APPARATUS & SUPPLIES:

Electric Sales & Service Co., Atlanta, Ga., Civil Aero. Auth., cable	58,110
John A. Roebling's Sons Co., Trenton, N. J., Philadelphia, Navy Yard, cable	21,656
Gill Glass & Fixture Co., Philadelphia, Pa., Treas., Proc. reflectors	16,049
Chas. G. Stott & Co., Inc., Washington, Treas., Proc., lamps, elec.	15,664
Kearfott Engineering Co., New York, War, Signal Corps, radio antenna loop	13,025

TRANSPORTATION EQUIPMENT:

Wright Aeronautical Corp., Paterson, N. J., Navy, S&A, engines and parts	222,755
Keuffel & Esser Co., Hoboken, N. J., Navy, S&A, sights, aircraft	166,950
Bendix Products Div. of Bendix Aviation Corp., South Bend, Ind., Philadelphia Navy Yard, airplane brake parts	10,632
United Aircraft Corp., Pratt & Whitney Aircraft Div., E. Hartford, Conn., Philadelphia Navy Yard, aircraft engine parts	11,245
Macwhyte Co., Kenosha, Wis., Philadelphia Navy Yard, terminals, cable	10,083
United Aircraft Corp., Pratt & Whitney Aircraft Div., E. Hartford, Conn., Philadelphia Navy Yard, aircraft engine parts	37,818
International Harvester Co., Inc., Washington, CCC, Agriculture, trucks	42,050
General Motors Corp. (Chev. Div.), Detroit, Farm Security Adm., trucks	90,013
Fargo Motor Corp., Detroit, Farm Security Adm., trucks	22,900
American Car & Foundry Co., New York, War, Engineers, cars, tank	63,200

New Unit Heater Design and Other Plant Service Apparatus

(CONTINUED FROM PAGE 41)

strong. The units may be installed in either vertical or horizontal pipe lines with standard fittings. For screwed connections, they are available in sizes from ¼ to 1¼ in. pipe sizes and with flanged connections from 1½ to 2 in.

WHERE compressed air is used for blowing, a new Air-O-Check valve unit that screws on to the hose is announced by the *Air-Way Pump & Equipment Co.*, 625 West Jackson Boulevard, Chicago. This valve employs a ball and socket joint with enclosed actuating lever so that all operating parts are shielded within the valve and air hose. To release the air, it is only necessary to flex the hose by a slight pressure between thumb and finger. The device comes with either male or female fitting for hose attachment, and is made of bar brass and stainless steel for ⅛, 3/16 and ¼-in. hose. A variety of nozzles are available for different types of work.

Steam and Water Valves

ALL metal against metal construction, eliminating the necessity for a packing gland, and a Veriquick renewable seat and slip disk of high hardness are features of a new packless T-globe valve now being manufactured by the *Monat Valve & Forge Co.*, 1022 Bessemer Building, Pittsburgh. These valves are designed for pressures varying from 150 to 1500 lb. and temperatures up to 1100 deg. F. They are available in nominal pipe sizes from ½ to 4 in.

JENKINS BROTHERS is introducing an advanced line of corrosion-resisting stainless steel valves for severe service. They are regularly made in two types, both of the 18 per cent chromium, 8 per cent nickel variety, but with small additions of either copper or copper-molybdenum and with the carbon content limited to a maximum of 0.10 per cent. They are made in seven different styles: solid wedge or double disk gate valves; union bonnet or bolted bonnet regrinding globe or angle valves; and bolted bonnet Y-valve, all either with screw or flanged connections and in sizes ½ to 3 in.

A SOLENOID operated water valve in which the seat is held tightly closed by a spring loaded leverage system instead of only the weight of the solenoid armature is being marketed by *McDonnell & Miller*, Wrigley Building, Chicago. Tight closure against fluid or water pressure up to 150 lb. is claimed. The valve and seat are of stainless steel and packing is eliminated through the use of Sylphon bellows. Discharge capacity ranges from 1100 to 3200 lb. of water per hr., depending upon the differential in pressures.

Cement Floor Maintenance

FLOR-DYE is an oil-proof and generally stain-proof material that seals the pores of cement floors, preventing the absorption of oils and greases. A new product of the *Truscon Laboratories*, Detroit, it does not form a surface film, but penetrates, becoming an integral part of the cement surface. For this reason, it does not wear off easily, and it is claimed that the material will not peel off or crack. It must, however, be used over an unpainted surface. Flor-Dye is available in many colors.

AN improved Ruggedwear primer, processed with cellulose, is offered for resurfacing cement floors by the *Flexrock Co.*, 800 N. Delaware Avenue, Philadelphia. The basic material was produced about a year and a half ago, but the improved product is said to have greater strength, better cementing properties and tenacity of hold on nearly any surface. To apply the material is thinned out with about 30 per cent water and brushed on, after which the concrete repair material can be troweled on to a feather edge without danger of cracking off. The primer may also be used to attach other flooring materials to cement.

Structural Accessories

A NEW steel stud, featuring channel sides, large uniform openings and reinforced X-shaped members, has been developed by the *Milcor Steel Co.*, Milwaukee. It serves a three-fold purpose, as studding, ceiling runner and floor track. Installation is aided by a specially designed shoe for attaching one member to another, horizontal or vertical combinations being possible for openings of any desired size. Conduit and pipe openings are 6 in. on centers on all stud sizes, which range from 2 to 6 in.

A QUICK means of fastening structural members without weakening both of them by drilling or punching, such as in the installation of conveyor supports, is to be found in the safety hook bolt head and deep washer, made by the *Fanner Mfg. Co.*, Cleveland. The device has been used in foundries and factories in England for the past two years and the American and Canadian rights have recently been acquired by the Fanner company. The device can be used for fastening a wood batten to a steel girder, for mounting standard hangers or brackets to girders, fastening crane rails to the main track girder, or clamping two I-beams together at right angles. The hook bolt head has a number of parallel serrations for gripping sloping sections found in rolled shapes, and the deep washer is set into the head to allow the nut to be tightened freely. Otherwise, the hook head is recessed to keep the bolt head from turning.

Monorail Charger For Small Foundries

THE increasing use of charging equipment especially designed to fulfill the requirements of small foundries is illustrated by the accompanying photograph which shows a recent installation of this type of equipment in a small Eastern foundry. The charging equipment, manufactured by the Peerless Monorail Co., Lansdale, Pa., is controlled by one set of push buttons at ground level and an identical set located on the charging platform. The buckets are of the hinged, double flap type and the installation is capable of handling 35 tons a day. The experience of the foundry that installed the equipment was that in addition to effecting economies in the charging labor costs, the mechanical charging equipment greatly prolonged the life of the cupola lining and provided a more uniform grade of iron.

THIS WEEK IN WASHINGTON

. . . U. S. trade agreements with Britain, Canada include important mutual rate reductions in iron and steel products . . . Dominion cuts tin plate duty . . . Labor Department pushes state wage laws.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON.—Marking the foremost achievement of the Roosevelt Administration in its sweeping reciprocal tariff program, trade agreements by the United States with Canada and with the United Kingdom of Great Britain, and Northern Ireland, Newfoundland, and the British Colonial Empire embraced important mutual rate reductions in iron, steel, machinery, and other metals.

The agreements were made public last Thursday and will become effective Jan. 1. They will have an initial term of three years from the day of their proclamation by the President and may continue in force indefinitely thereafter until six months after notice of termination has been given by any of the affected countries. It was the first trade agreement ever made with the United Kingdom. The Canadian agreement replaces the one now existing.

Among the most important new duty reductions made by Canada in the metal schedule are those in the duties on tin plate, terne plate and galvanized sheets from 20 to 17½ per cent, and cuts in duties on such items as cold drawn bars, hoops, bands and strips and welded pipe and seamless tubes. Canadian duties also were reduced from 20 per cent to 10 per cent on a large group of miscellaneous machinery not made in Canada. Many duty reductions, some in iron and steel and related products, also entail a narrowing of margins of British preferences.

Canada's Special Tax Dropped

A major concession is that Canada in the future will remove its special import tax of 3 per cent ad valorem from all items, dutiable or free. This tax is computed on the basis of duty-paid value, thus averaging about 3½ per cent on the dutiable value, according to the State Department.

In the new agreement the United States and Canada guarantee to accord each other unconditional "most-favored-nation" treatment with the usual exceptions as regards special trade advantages between the United States and Cuba and between Canada and other British colonies. The United Kingdom agreement also gives most-favored-nation treatment to the United States which assures treatment to American exports no less favorable than that accorded to any other non-British country.

The most important new duty reduction in the metal schedule granted to Canada relates to aluminum, from 4c. to 3c. a lb.; nickel from 3c. to 2½c. a lb.; zinc ores from 1½c. to 1 1/5c. a lb.; zinc metal from 1¾c. to 1 2/5c. a lb.; cadmium from 15c. to 7½c. a lb., and hollow bars and drill steel, from ¾c. a lb. to 20 per cent.

Provisions regarding ferroalloys differ little from those of the Canadian 1936 agreement. Spiegeleisen was added, the American duty of 75c. a ton being bound against an increase. The reduction of 40 per cent in the protective part of the duty on high carbon ferromanganese—that is, the excess of the rate above the amount necessary to compensate for the duty on manganese ore—was continued. The rate on 8-30 per cent ferrosilicon, reduced from 2c. to 1½c. a lb. under the 1936 agreement, has now been made 1c. Minor concessions were made by the United States on ferrochrome, ferrotitanium, ferrovanadium and ferrouranium. Many duties in the metal schedules of both Canada and the United States were bound.

Metal Furniture Benefits

United Kingdom concessions to the United States include reductions averaging about one-fourth on office machinery. The duty also was lowered from 20 to 15 per cent on the more important classes of metal furniture. Reductions also were made on several important classes of electrical machinery. On most of these items the former rate of 20 per cent was made 15 per cent. These concessions cover such items as refrigerators, washing machines, vacuum cleaners, and cooking utensils. The agreement also reduces United Kingdom duties on gasoline and oil pumps, laundry and dry cleaning equipment, sewing machines, etc.

Imports from the United Kingdom in the metals and manufactures group on which the United States made concessions were, according to the State Department summary, valued in 1937 at about $5,000,000. More than one-tenth of the statistical classification covering imports in the field are affected by the concessions, most of which reduces the rates of duty in effect in 1938. The summary said the domestic production of items similar to those on which concessions were made was between $2,000,000,000 and $3,000,000,000 in 1937 and United States exports were more than 50 times the imports from all countries.

Machinery Duties Cut

The statutory duty on electrical machinery and apparatus, including many machines in which the electrical

HERE'S NEW INDOOR DAYLIGHT FOR SHOPS AND FACTORIES

G-E FLUORESCENT MAZDA LAMPS GIVE SEVERAL TIMES MORE LIGHT . . . 50% COOLER

MORE LIGHT . . . COOLER—The new G-E Fluorescent MAZDA lamps give several times more light than incandescent lamps of the same wattage and color. For the same amount of light, they are 50% cooler. This is important to shops and factories where adequate lighting has been neglected in the past because accompanying incandescent heat has been hard on employees, as well as a burden to air conditioning plants.

NEW INDOOR DAYLIGHT—The daylight Fluorescent lamp provides the closest approach to real daylight ever produced at high efficiency. It affords new opportunities for lighting those departments where form and color must be checked closely . . . such as fine production, inspection operations, and intricate assembly. With fluorescent lighting, it is possible to "daylight" entire departments economically instead of limiting the daylighting to small areas.

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RATE CONCESSIONS BY CANADA

	Rates of Duty November, 1938	New Rate
Aluminum and alloys, crude or semi-fabricated forms; rolled or drawn shapes, plates, sheets, strips, pipes, and tubes	30%	27½%
Bars, cold rolled, drawn, reeled, turned, or ground, n.o.p.	25%	20%
Hoop, band or strip, of iron or steel:		
Hot rolled, 0.080 in. or less in thickness, n.o.p.	15%	12½%
Hot rolled, more than 0.080 in. in thickness, n.o.p.	$8	$7
Sheets, plates, hoop, band or strip:		
Coated with tin, n.o.p.	20%	17½%
Coated with zinc, n.o.p.	20%	17½%
Coated with metal or metals, n.o.p.	12½%	10%
Railroad tires, in the rough	10%	7½%
Axles and axle bars for railway vehicles	27½%	25%
Welded pipe or seamless tubes, with plain or processed ends, not more than 10½ in. in diameter, n.o.p.	27½%	25%
Fittings and couplings	27½%	25%
Diesel and semi-diesel engines and parts	25%	20%
Air-cooled internal combustion engines up to 1½ hp. and parts	25%	20%
Specified construction and road building machinery not made in Canada	10%, 20%, or 27½%	10%
Stainless steel sheets, strip, etc., valued at not less than 5c. lb.	20%	17½%
Nuts, bolts, washers, and rivets	50c. 100 lb. and 18%	50c. 100 lb. and 17½%
Aircraft engines and parts	22½%	20%

RATE CONCESSIONS BY UNITED STATES IN U. K. AGREEMENT

	Rate Before Agreement	Rate Under Agreement
Fluorspar, over 90% calcium fluoride, gross ton	$5.60	$4.20
Pig iron, not more than 4/100 of 1 per cent of phosphorus, ton	1.125	75c.
Sashes and frames	25%	15%
Wire rope	35%	2½c. lb., but not less than 17½% nor more than 35%
Iron or steel anchors and parts	25%	15%
Balls and roller for bearings	8c. lb. and 35%	8c. lb. and 25%
Power transmission chains:		
Of iron or steel, of not more than 2 in. pitch and containing more than 3 parts per pitch, and parts thereof, valued at not less than 40c. lb.	40%	25%
Power transmission chains, n.s.p.f., and parts thereof	35%	25%
Grit, shot and sand of iron or steel	¾c. lb.	⅝c. lb.
Industrial electric furnaces and ovens	35%	25%
Reciprocating steam engines (except locomotives) and parts	15%	10%
Lace making machines, n.s.p.f., except levers or go-through lace machines	30%	15%
Circular knitting machines and parts	40%	20%
Braiding, winding, warping, cordage, and carding machinery	40%	20%
Other textile machinery and parts	40%	25%

RATE CONCESSIONS MADE BY UNITED STATES IN CANADIAN AGREEMENT

	Rates of Duty Before New Agreement	Under New Agreement
Ferrosilicon, 8-30%	1½c. lb.	1c. lb.
Hollow bars and drill steel valued at 8-12c. lb.	3¼c. lb	20%: min. 1⅝c. lb.
Axles and parts, axle bars, axle blanks and forgings, n.s.p.f., valued at not more than 6c. lb.	6/10c. lb.	3/10c. lb.
Molders' patterns for castings	50%	25%
Chains:		
Less than ¾ and not less than ⅜ of 1 in. in diameter	1⅛c. lb.	¾c. lb.
Less than ⅜ and not less than 5/10 of 1 in. in diameter	2⅛c. lb.	1½c. lb.
Dead-burned basic refractory material containing 15% or more of lime and consisting chiefly of magnesia and lime	27½%	20%

RATE CONCESSIONS BY UNITED KINGDOM

	Rate Before Agreement	Rate Under Agreement
Bolts, screws and nuts	6s. to 18s. 8d. per 100 lb. or 20% whichever is the greater	15%
Metal furniture	20%	15%
Tracklaying tractors	33⅓%	25%
Air conditioning machines	20%	15%
Sewing machines	20%	15%
Warp tying and drawing machines	20%	15%
Leather and rubber belting machinery	15%	10%

feature is a minor factor, is 35 per cent. Under the agreement the rate on items constituting the bulk of the imports in this group will become 25 per cent and on certain special items the rates will become 27½, 22½ or 17½ per cent. A number of duty reductions were also made on other types of machinery. The machinery concessions include, among other items, reciprocating engines, steam turbines, internal combustion engines, sewing machines and most classes of textile machinery. The American duty on low phosphorous pig iron was reduced from $1.12½ to 75c. The duty on other grades of pig iron was left unchanged at the former rate. The United States also granted reductions in rates on sashes and frames, anchors, transmission chains, bearings. It reduced the duty on fluorspar from $5.60 to $4.20 per gross ton, this being among concessions to Newfoundland or other British colonies.

In the United Kingdom agreement concessions were made in non-self-governing overseas territory under British authority on a wide variety of machinery whose trade totaled $2,711,000 in 1936. One of the most important classes of products on which concessions to the United States were obtained is office machinery, including typewriters, concessions on which, mainly bind British preferential margins on trade valued at $200,000 in 1936. Fifty-five reductions and bindings were obtained on other machinery. These were chiefly bindings of small preferential margins. In the summary of the agreement it was stated that possibilities for future development of export trade are also safeguarded in 29 territories by undertakings not to impose a margin of preference greater than 5 per cent ad valorem and in two cases to impose no preference.

Arnold Discusses Advertising Control

WASHINGTON. — Thurman Arnold, head of the Justice Department's anti-trust division, has denied that the consent decrees signed with the department by the Ford Motor Co., and the Chrysler Motor Corp., is indicative of his desire to regulate advertising.

Since the decrees were signed two weeks ago, the department has been under criticism for its announcement that the advertising regulations, to which the companies agreed, may become "most important precedents in

preventing the misuse of advertising power in other fields." The Assistant Attorney General, however, has since attempted to clarify the department's stand by pointing out that while voluntary advertising restrictions might be reasonable in consent decrees, there is nothing in the anti-trust laws which permits the department to regulate advertising.

Referring to his former statement that "monopoly is fostered when advertising is used to put competitors at a disadvantage," Mr. Arnold in response to a letter from R. I. Elliott, associate editor of *Advertising and Selling*, said:

"In my judgment, sound advertising is a creative effort, and would not be an appropriate subject for coercive regulation. . . . Any determination that a particular kind or use of advertising is uneconomic can best be made by the businessmen and advertisers concerned, and unsound results can best be remedied through voluntary concerted action on the part of advertisers. Thus, when by voluntary agreement with competitors, any concern seeks to set up advertising practices designed to promote maximum consumption and, at the same time, to give smaller competitors fair access to the markets, such an effort will be encouraged by the anti-trust division, within the framework of its consent decree policy, as reasonable and beneficial. This is what we had in mind in our (former) release."

Wage Laws for States Sought

WASHINGTON.—A model fair labor standards bill which the Labor Department hopes the states will adopt to dovetail with and make more effective the Federal wage and hour law was the major subject for discussion at the three-day session of the fifth National Conference on Labor Legislation which ended Nov. 16.

Representatives of labor departments in 43 states, the District of Columbia, Alaska and Puerto Rico, and labor union observers jammed the conference room in the Labor Department building and heard Secretary Perkins point out that "we still have 23 states without minimum wage legislation, 30 states without a legal limit of eight hours, even for women, and 26 states with none at all."

The suggested model bill for states to follow in passing wage and hour legislation, submitted by the committee on state wage and hour legislation, embodied many of the provisions contained in the Federal statute and followed substantially that general form. No rates of pay or hours of employment were written in the model draft but reference was made to the standards set up under the Federal law. Provision is made for a gradual change in minimum standards as was done in the national wage and hour law.

Some Workers Unprotected

The proposed draft was put forward by the committee with the statement that passage of the Federal statute had "focused attention upon the need for supplementary state legislation." The committee added that "most workers in purely intrastate employments, comprising chiefly the service and retail trades, are still without comparable protection, and it is generally recognized that these are occupations in which many of the worst abuses exist."

Elmer F. Andrews, administrator of the Fair Labor Standards Act, told the meeting that he looked forward to the time when each state will be equipped to take over all investigations and inspections under the Federal law but made no reference to his hope, expressed on several previous occasions, that state laws supplementing the national law would be passed. A good deal of the spade-work in urging supplementary legislation was understood to have been done within the committees but there were indications that, because of the preponderant, representation of labor spokesmen for the various state departments, there was little necessity for urging these representatives to push for state wage and hour laws, many of them already having been convinced of that need.

Foremen Should Study Economics, Craigmile Says

CHICAGO. — Foreman training should be broadened to include industrial economic subjects, declared C. S. Craigmile, vice-president, Belden Mfg. Co., Chicago, at a dinner last week of the Southern division, Illinois Manufacturers Association. Foremen should know the answers to every-day questions of employees about wages, hours, taxes, social security, unemployment insurance, unionism, etc., he said, so that their influence and prestige among employees will be enhanced.

British Steel Output Rises and Business Is Steadily Improving

LONDON (By mail). — United Kingdom steel output in October totaled 854,800 tons. This was 100,100 tons above the September total, a rise which constitutes a greater increase than any movement between September and October recorded over the past 10 years. The October, 1937, output was 1,133,600 tons.

The increase in October over September was equivalent to 13.4 per cent, but compared with the production in October, 1937, last month's total shows a fall of 278,200 tons, or 24.6 per cent.

There were 76 furnaces in blast at the end of October, compared with 77 at the end of September, three having ceased operations during the month and two have re-started.

Pig Iron Up 9.2 Per Cent

October pig iron production totaled 469,400 tons, an increase of 39,600 tons, or 9.2 per cent over September and 300,200 tons, or 39 per cent, below the October, 1937, figure of 769,600 tons. The working month for pig iron was a day longer than September, but the daily rate of output increased by approximately 6 per cent. In regard to steel there was the same number of working days in October as in September.

Following this statistical statement, it has been announced that the improvement in the iron and steel markets is being maintained and that business is now expanding in practically all departments. To a certain extent this is due to the requirements of the accelerated rearmament program and the civilian defense program, but there has also been a definite revival in the demand for ordinary commercial purposes. The decision to accelerate the rearmament program was made too recently to be reflected in the figures for October, but it should influence the November figures and those of subsequent months. The political crisis was too short-lived to have had much effect on the purchase of steel in October and, so far as can be ascertained, there was no panic buying for emergency purposes.

The October increase, therefore, represents mainly commercial buying for consumption. This is significant, as many consumers are still favorably placed with stocks and their purchases only represent hand-to-mouth necessities pending the commencement of 1939 prices.

Clairton Project Points to Gain for Porcelain Enamel

CLEVELAND. — The Clairton, Pa., housing project suggests the feasibility of increased use of porcelain enamel in mass production homes, the eighth annual meeting of the Porcelain Enamel Institute, Inc., was told here Nov. 17.

Royce W. Gilbert, Gilbert-Varker, Inc., Philadelphia, reported that the porcelain enamel shutters, panels and trim have occasioned very little installation trouble at Clairton, where 300 houses are being erected.

"We are using in the houses a great deal of light gage steel which is not porcelain enameled," he said. "I have come to the conclusion these parts could be porcelain enameled to good advantage."

The speaker pointed out that the use of porcelain enameled steel for cornices and corner boards, entrance hoods, shutters and bathroom panels at Clairton had been adopted only after close consideration, and because of the need for low maintenance costs and the necessity of making outside color permanent. He described the mass production set up in the field, where 100 to 150 truckloads of material arrive per day and where construction crews move from house to house, and explained that advantages of this general method include savings in freight differentials and the avoidance of prejudice in labor circles.

The fixed trim is attached with electric screw drivers set at constant pressure, he said. Outside joints are ⅛ in. The fit of the bathroom panels to the tubs, which are being supplied by two tub makers, has been satisfactory although it has been found advisable to use a joint over ⅛ in. These panels are backed with soundproofing compound.

"In a certain light the shutters, which are purely decorative, show waviness, but this is more of a comparative than a direct criticism," said Mr. Gilbert.

R. H. Turk, Porcelain Enamel & Mfg. Co., Baltimore, told the delegates work is progressing on a sag test, and another problem under study by the institute deals with chipping, its causes, measurement and elimination.

Discussing the recently released test on abrasion of enamels, Mr. Turk predicted appreciable improvement in scratch resistance over the next few years.

"I think we may be compelled soon to have specifications," he said. "Either we will set them up or they will be forced upon us."

George S. Blome, Baltimore Enamel & Novelty Co., reported the institute market research committee will adopt the questionnaire method soon, first to ascertain whether the gasoline pump industry is worthy of extensive effort as a market, followed by surveys on toilet partitions and transformer housings.

"I suppose our really biggest field will continue to be the architectural field," he said. "Up to the present we have been handicapped in getting proper erection and suitable distribution in centers other than those immediately surrounding enamel plants."

R. M. King, Ohio State University, urged that institute members capitalize on promotion work already done, by the Government, steel and construction companies, magazines and other agencies. He reported the institute's new architectural bulletin will cover types of enamels and their thickness, flatness, joints and other data. Panel size of 9 sq. ft. maximum will be recommended; thickness of joints ⅛-in. and rustproof metal fastenings.

H. D. Chase, Chicago Vitreous Enamel Product Co., and H. V. Mercer, American Rolling Mill Co., discussed sales promotion. A report on the fair labor standards act was presented by C. M. Dinkins.

Institute officers were reelected. New members of the board of trustees include Ernest Hommel, O. Hommel Co., Pittsburgh; J. W. Fall, Benjamin Electric Mfg. Co., Des Plaines, Ill.; N. G. Wedemeyer, Rohm & Haas Co., Columbus, Ohio, and R. R. Danielson, Metal & Thermit Corp., Carteret, N. J.

Advertising is no panacea for distribution of ills, said Mr. Mercer, advertising manager of American Rolling Mill Co., who pointed out the product must be right, the distribution channels must be reasonably clear, and the advertiser must realize that unless seasonal factors intervene, advertising should have reasonable continuity.

2 MILES HIGH, 2 MILES DEEP, OR IN HEAVY TRAFFIC...

YOU'RE MONEY AHEAD

BY USING

NICKEL ALLOY STEELS

BORING 2 MILES down through rock puts tremendous stresses upon oil well machinery. To shoulder such loads the Baldwin-Duckworth Chain Corp., Springfield, Mass., has developed what is said to be the strongest chain of its type ever built. With links and pins of 1.50-2.00% Nickel alloy steel, tests show a minimum ultimate strength of 185,000 lbs. Baldwin-Duckworth also builds conveyor chains from "18-8" Nickel-chromium stainless steel to resist corrosion and withstand elevated temperatures. By minimizing causes of repairs and replacements, Nickel saves you money.

GIVING WINGS to business—every plane built relies on Nickel alloy steels to assure great strength without excess weight. Wherever metals carry high loads or transmit heavy power loads, there Nickel is needed. Important also to the aircraft industry is the increasing application of corrosion resisting steels containing 8% Nickel for wings, tail assemblies, floats and other structural components which must be strong, durable, light in weight, and economical in maintenance.

LIGHTENING HAULING COSTS through Manhattan's congested traffic, a fleet of these new Gar Wood self-loading, self-dumping trucks on GMC chassis is now saving money for New York taxpayers. These lighter, stronger bodies are of Yoloy, a high tensile Nickel-copper steel produced by The Youngstown Sheet & Tube Co. In addition to high strength/weight ratio, Yoloy Nickel alloy steel provides resistance to both abrasion and corrosion. Have you asked for information about the newest uses for Nickel in your industry?

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

. . . OBITUARY . . .

JOHN A. BRYANT, treasurer and founder of Bryant & Detwiler Co., construction firm, died Nov. 15 in Detroit. At the time of his death Mr. Bryant was also vice-president of the Ferro Stamping & Mfg. Co. During his career as an engineer and builder, his firm built various units of the Ford Motor Co., Rouge plant, Packard Motor Car Co., Dodge Brothers and the J. L. Hudson Co. department store. He was born at Lake George, N. Y., in December, 1880, and was graduated from the University of Michigan in 1902, founding his own firm in 1906.

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HERBERT HOWARD RICE, former vice-president of General Motors Corp. and former president of Cadillac Motor Car Co., died of a heart attack Nov. 15 at a hunting lodge at Onaway, Mich. Mr. Rice went to Detroit in 1916 as treasurer of General Motors. He left General Motors in January, 1931, to enter private business after he had served five years as assistant to the president. At the time of his death he was president of the Sweet Oil Refining Co., Petroleum Investors, Inc. Born Feb. 25, 1870, he was graduated from Brown University in 1892 and became advertising manager of the Polk Mfg. Co. In 1904 he joined the staff of the Waverly automobile factory at Indianapolis. From 1908 until 1916, he was president of the Waverly company. He served as treasurer and director of the National Automobile Chamber of Commerce, president of the National Metal Trades Association and a member of the National War Labor Board. He had been a trustee of Brown University since 1920.

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CHARLES E. ST. CLAIR, works manager of the Sivyer Steel Casting Co., Milwaukee, died on Nov. 5 at Springfield, Ohio, while on a tour of steel foundries in the Ohio area. He was 52 years of age. He joined the Sivyer firm in 1918 as plant superintendent.

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WILLIAM SPINDLER, production manager of the Harley-Davidson Motor Co., Milwaukee, manufacturer of motorcycles, died on Nov. 5, aged 48 years. He joined the firm in 1910.

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CONSTANTINE F. WEIMER, founder and president of the Weimer Welding & Cutting Co., Milwaukee, died on Nov. 4, aged 50 years. He was born in Germany, coming to America in boyhood. He established the Weimer firm in 1916.

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JOSEPH A. BOYDEN, secretary Van Dorn Iron Works Co., Cleveland, and a former vice-president of the company, died in Cleveland after a heart attack on Nov. 15, aged 52 years. He had been in ill health several years.

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WALTER S. MOODY, retired engineer and associated with the General Electric Co. many years, died Nov. 7 at his home in Pittsfield, Mass. Mr. Moody was born in Chelsea, Mass., Sept. 20, 1864, was graduated from Massachusetts Institute of Technology in 1887, with that institute's first engineering class, became designing engineer, transformer division, for the Thomson-Houston Co., Lynn, Mass. When that company was merged with the General Electric Co., he became chief engineer of the transformer department, eventually locating in Pittsfield.

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MICHAEL SWEDISH, representative of the Gar Wood Industries, Inc., Detroit, at Los Angeles, since 1929, and for many years active in industry at Milwaukee, died on Nov. 7, aged 43 years. He was born in Calumet, Mich., but had resided in Milwaukee since boyhood.

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ADOLPH G. DROEGKAMP, secretary-treasurer of the Droegkamp Furnace Co., Milwaukee, died on Nov. 9, aged 63 years. He was born in Milwaukee and joined the furnace firm under his father in 1898.

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GUSTAF L. SCHNEIDER, founder of the Capital City Culvert Co., Madison, Wis., which is one of the principal suppliers of corrugated sheet metal products for highway construction in Wisconsin, died recently at the age of 78 years. He retired from active business in 1927.

An etching by one
Edmund Hellmer, portraying
"THE ALCHEMIST"
(No data is available as to the
original painting)

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Limitations of Contour Measuring Apparatus Discussed

THE optimum magnification of optical contour measuring apparatus is 50 times, according to Henry Kurtz, optical engineer of the Bausch & Lomb Optical Co., of Rochester, N. Y., who spoke on Nov. 15 before the New York-New Jersey Chapter of the American Society of Tool Engineers at Newark, N. J. With higher magnification, the probable errors actually tend to increase, laboratory measurements on the latest type of equipment showed. Mr. Kurtz was largely responsible for the development of the new B. & L. contour projector, which is as free from optical errors as any his company has produced. Yet, even in this instrument, there is inherently 0.1 per cent error in magnification and 0.4 per cent in angular and linear dimensions. Greater accuracy is ultimately possible, Mr. Kurtz indicated, but the first cost of the apparatus will greatly increase, and the operating cost or time of reading will also increase beyond the range of economic practicability. Limits of accuracy in measuring angles is 1 min. of arc by projection methods, but with present day methods of production it is not possible to make an angle closer than 2 min. of the desired arc.

Several inherent limitations in accuracy were pointed out by the speaker. The light source in projection apparatus is never a geometric point, and to offset this, a diaphragm is interposed beyond the objective lens. The smaller the diaphragm size, the more do the light rays become truly parallel (permitting relatively thick objects to be shadowgraphed), but the less light comes through, resulting in a less sharp definition of the image on the translucent screen. An additional error is introduced by the draftsman in drawing the desired standard outline on the ground glass or in outlining the projected image of a standard part.

One of the points stressed by Mr. Kurtz, however, was that errors of measurements are in general less than errors in manufacture of parts, and that the optical method affords the only means of checking the outline of small parts of intricate shape. Light in itself is imponderable, has no weight, and is inflexible, hence imposes no strains on the piece being measured nor leaves any marks of measurement.

Need for "Shirt-Sleeve Management" Stressed at Founders Convention

THE necessity for industrial management to develop closer contact with employees in order to combat the many threats to the "American way" that exist today was the dominant theme of the 42nd annual convention of the National Founders Association, held Nov. 16 and 17 at the Waldorf-Astoria Hotel, New York.

Striking this keynote in an address before the 180 members who attended the convention, F. R. Hoadley, president of the association, said, "Speaking as one who wishes to see labor receive its full share of the fruits of enterprise, without an unreasonable deduction either for the Government or for intermediaries who perform labor no real service, what may we all do to bring about a correction of the present situation?

"It seems to me that some have already shown the way. Some who have given this matter serious thought and have begun to talk to labor in a way which no agitator can undermine. These employers are simplifying their financial statements to such a degree that even the lowliest in their employ can understand that if labor takes too large a share of the employers income, the employers will not be able to buy tools for labor to use; they are explaining that taxes are part of the price of goods and that when taxes raise the price too high, the people will not buy goods and the employers cannot pay good wages, let alone in some cases any wages. In other words, some employers are winning their employees' confidence back by the expedient of telling their story in a simple understandable way."

Mr. Hoadley concluded his address in an optimistic vein, saying, "Thrift and independence are inherent in the American employee. They know there is only one way to get the education they want for their children, the life they want for their families, and that is through a good job at good pay. Leave business free to go ahead, get production going again at top speed and the American workman will put his shoulder to the wheel and do his full share."

European Labor Conditions

A succinctly summed up picture of industrial labor relations in various European countries was given by Whiting Williams of Cleveland, who spoke on "What We Can Learn from European Workers." One of the outstanding recent developments abroad, Mr. Whiting said, was the growing trend toward the elimination of wage differentials based on skill. This is fast leading to the creation of a class distinction, he felt, which does not exist in this country. This class feeling tends to create a class particularly amenable to political pressure and stagnates individual initiative. The removal of wage differentials also leads to a shortage of skilled labor, as Great Britain has discovered, the speaker said, and he attributed Britain's efforts to establish industrial plants in Canada as being caused to a great extent by the need to tap a new source of skilled labor.

Despite the fact that wage differentials are contrary to the precepts of Communism, Mr. Whiting said that of late Russia has found it necessary to increase wage differentials among Soviet workers in order to secure more efficient production.

When comparing industrial relations in the United States with those abroad there are several conditions which must be kept in mind, Mr. Whiting declared. The first is the difference in size between Great Britain and Sweden, the countries most frequently held up as ideals, and the United States. Sweden, the speaker said, is about the size of California and has a population of about 6,000,000 and it is naturally a simpler problem to harmonize employees' and employers' claims under such conditions than it is in the United States where such tremendous geographic and racial divergencies exist. It was noteworthy, Mr. Whiting said, that in both Sweden and Great Britain, management is thoroughly organized on a nation-wide basis. Contracts with labor unions specifically state that management reserves all rights of management and may hire or discharge workers as may be necessary. There are no check-offs or closed shops in Great Britain, and it is the practice of the national arbitration board to take no steps toward settling a strike until all workers have returned to work. He also found that labor leaders abroad were more responsible and capable of taking a long term view, a characteristic which he felt was lacking in labor leaders here.

Weighing up past accomplishments both here and abroad, Mr. Whiting

said he felt that the element needed to obtain lasting industrial peace was more "shirt-sleeve management"; direct, face to face experience with the problems of labor.

Chronic Deficits Dangerous

The contemporary tax problem and all its many ramifications was the subject of a discussion by Prof. F. R. Fairchild of Yale University, in which he declared that "chronic deficits" engender a defeatist attitude on the part of industrial and commercial leaders and encourage extravagant spending. Discussing the growing share of the national income which taxes are taking, Professor Fairchild pointed out that in 1890 tax revenues were 7.2 per cent of the national income; in 1913 were 6.4, in 1922 were 13 per cent and in 1936 were 16.1 per cent.

Pump Priming Ineffective

Pump priming, Professor Fairchild said, is only a temporary expedient and does not insure permanent prosperity as past experience has shown.

W. W. Cumberland, economist of Wellington & Co., New York, who addressed the membership on the "Outlook for Business," pointed out that the rapidity with which the business picture changes under present conditions makes it impossible for statisticians to forecast more than a few months ahead and this had had the effect of causing confusion in the mind of potential investors. Illustrating this, he said that from 1921 to 1929 approximately $280 billion was invested in industry, while from 1930 to 1938 only $16 billion was invested.

Favors "Exit-Interviews"

An interesting feature of the closing session on Thursday was the talk given by George A. Seyler, works manager, Lunkenheimer Co., Cincinnati, on "This Thing Called Grievance." In his talk, Mr. Seyler added emphasis to the meeting's theme of getting down to "shirt-sleeves" in dealing with employees. Only by doing this, he said, can management acquire the proper prospective to enable it to develop harmonious industrial labor relations.

A feature of the liberal labor policy of the Lunkenheimer Co. over the past 10 years was what Mr. Seyler termed an "exit-interview." This consists of interviewing every man that leaves the company's employ of his own volition. These interviews, Mr. Seyler said, brought out many irritating conditions of which the company was not aware and gave the company an insight as to the reaction of employees to the company's efforts to promote good employee-employer relations. A conscientious "exit-interview," Mr. Seyler found, was a particularly effective way to reduce labor turnover.

A. D. Lynch, industrial relations manager, J. I. Case Co., spoke on the subject of good housekeeping, waste elimination and accident prevention.

The election of officers resulted in the unanimous re-election of F. R. Hoadley, Atwood Machine Co., Stonington, Conn., as president; W. D. Hamerstadt, Rockwood Mfg. Co., Indianapolis, as vice-president; A. E. McClintock, Chicago, as commissioner and J. M. Taylor, Chicago, as secretary-treasurer. Recommendations of the nominations committee covering the personnel of the seven district committees were also approved. New members of the various district committees are as follows: First district, R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston; second district, T. H. Miller, DeLaval Separator Co., Poughkeepsie, N. Y.; third district, G. R. Casey, Treadwell Engineering Co., Easton, Pa.; A. H. Thomas, Buckeye Steel Castings Co., Columbus, Ohio, and C. F. Clark, Monroe Steel Castings Co., Monroe, Mich.; fifth district, E. L. Berry, Link-Belt Co., Chicago; sixth district, W. J. Grede, Spring City Foundry Co., Waukesha, Wis., and seventh district, W. F. Tynes, Hardie-Tynes Mfg. Co., Birmingham and F. Brown, Gray & Dudley Co., Nashville, Tenn.

National Founders Association

Officers for 1938-39

President, F. R. Hoadley
Atwood Machine Co.
Stonington, Conn.

Vice-President, W. D. Hamerstadt
Rockwood Mfg. Co.
Indianapolis

Commissioner, A. E. McClintock
Chicago

Secretary-Treasurer, J. M. Taylor
Chicago

Irvin Works Opening Dec. 15; Industrial Leaders Invited

PITTSBURGH. — Carnegie-Illinois Steel Corp.'s new Irvin works will be formally opened Dec. 15. Dedication will include an inspection trip by several hundred industrial leaders and corporation officials.

As mentioned in THE IRON AGE recently, the tin plate division of the Irvin works has been in operation for some time and the new hot continuous mill was turned over experimentally a few weeks ago. Officials expect to get regular production on or shortly after Dec. 1.

Three principal divisions of the Irvin works include an 80-in. continuous hot strip mill, a complete cold reducing tin plate mill, and a cold reducing sheet mill with necessary auxiliary equipment. Slabs are furnished by Edgar Thomson works, where a 45 x 80 in. reversing universal slabbing mill was recently completed.

The 80 in. continuous hot strip mill, which is nominally rated at 600,000 gross tons of hot rolled strip per year, consists essentially of a two-high roughing scale breaker, four-high spreading mill, squeezer, three four-high roughing mills, temperature control table and two crop shears, two-high finishing scale breaker, six four-high finishing stands, with flying shears, runout table, two coilers, piler and scale. Complete facilities for finishing 18 to 77 in. wide hot rolled strip are provided.

Pickled coils for tin plate are cold reduced in either a five-stand tandem four-high 20½ in. and 53 x 42 in. mill or a four-high 20½ in. and 53 x 54 in. reversing mill.

In addition to the five-stand cold reduction mill used for tin plate and the four-high reversing mill, there is a three-stand tandem mill 20½ in. and 56 x 84 in. Cold reduction mill is all designed to handle the new high tensile steels such as Cor-Ten, Man-Ten, Sil-Ten, and stainless steel, as well as open hearth and bessemer carbon steels.

First of Steel Farm Buildings Shipped by T. C. I.

TENNESSEE Coal, Iron & Railroad Co. this week started shipping the first of 12 units of prefabricated metal farm buildings to sites selected by the Farm Security Administration in Alabama, Georgia and South Carolina.

The dwellings contain five rooms—living room, three bedrooms, and combination kitchen and dining room. Two large closets and a pantry are included and space is available for a bathroom if desired. Approximately six tons of steel are used in the dwelling. All of the foundation structure, the frame, sides, roof, exterior door, and window trims and fireplace are of steel. Floors and doors are of wood. An insulating wall board is used as interior finish for the walls and ceilings. This also serves as insulation and is utilized in a manner designed to lend to the attractiveness of the interor.

Approximately 12 and one-half tons of steel are required for the unit of five buildings. The outbuildings are constructed entirely of steel.

Complete prefabrication enables swift erection of the buildings by the simple expedient of bolting together the pre-formed panels. It is anticipated that such work may be performed by the farmer, or purchaser, with a few helpers. Even the foundations of the buildings are prefabricated. The piers are formed from two hot-rolled steel channel sections, shop-welded to a steel footing plate, and coated with asphalt by a hot dipping process.

Inside partitions of the dwelling are insulating wall board surfaces supported on steel frames. Steel joists support the wood floor.

A steel fireplace with jacket enclosure and circulating air features provides a central heating system. This unit is economical in operation and furnishes a constant flow of warm air throughout the house.

Both dwelling and outbuildings will be available in several attractive designs and dimensions. This type of construction readily lends itself to expansion. If the home owner wishes to add a room, this is easily done by making the dimensions in multiples of four, such as eight by 12 feet, 12 by 16 feet, etc.

. . . THE NEWS IN BRIEF . . .

What Industrial Executives Think The Elections Mean to Business.—Page 41A.

UAW officials cool to General Motors wage security plan. . . . Automobile output comes close to 100,000, but is still lagging behind sales.—**Page 42.**

Gun forgings valued at $4,590.278 are the largest items among Government purchases announced by the Public Contracts Board.—**Page 44.**

Important tariff reductions on iron and steel products are included in U. S. trade agreement with United Kingdom and Canada.—**Page 46.**

Assistant Attorney General Arnold disclaims move to regulate advertising through Justice Department's anti-trust division.—**Page 47A.**

States offered model bill for adoption of wage and hour legislation to supplement Federal laws.—**Page 47B.**

Mill foreman should study industrial economic subjects, C. S. Craigmile, Belden Mfg. Co. executive, tells Illinois Manufacturers Association.—**Page 47B.**

Clairton, Pa., housing project suggests possibility of increasing use of porcelain enamel in mass production homes.—**Page 48.**

Optimum magnification of optical contour measuring apparatus is 50 times, Henry Kurtz, optical engineer, tells tool engineers at Newark.—**Page 52.**

National Founders Association at its annual convention stresses the need for "shirt-sleeve management."—**Page 52A.**

Carnegie-Illinois Steel Corp.'s Irvin works will be opened formally Dec. 15, with several hundred industrial leaders invited to attend.—**Page 52B.**

First of 12 prefabricated farm buildings are shipped to Southern states by Tennessee Coal, Iron & Railroad Co.—**Page 53.**

Still another NLRB decision favors the CIO, involving employees at the Meadville Malleable Iron Co., Vernon, Pa.—**Page 59.**

SECTIONS INDEX

MEETINGS

Nov. 25 and 26—American Foundrymen's Association, Purdue University, Lafayette, Ind.

Dec. 5 to 9 — American Society of Mechanical Engineers, New York.

Dec. 5 to 10—National Exposition of Power and Mechanical Engineering, New York.

Dec. 15—Grinding Wheel Manufacturing Association, Atlantic City, N. J.

Dec. 16—Abrasive Grain Association, Atlantic City, N. J.

Jan. 10 to 12—Institute of Scrap Iron and Steel, St. Louis.

Jan. 9 to 13—Society of Automotive Engineers, Detroit.

Occupational disease laws are increasing, 250 industrial executives at Air Hygiene Foundation meeting at Pittsburgh are told.—**Page 62.**

Columbia Machine Tool Co. acquires and will operate the Hamilton, Ohio, plant of Long & Allstatter Co.—**Page 63.**

Fleet of 8000 war planes for U. S. is visualized by Assistant War Secretary Louis Johnson in talk before New England Council.—**Page 63.**

Box cars and refrigerator cars, four tons lighter than present types, are to be exhibited by the American Car & Foundry Co.—**Page 63.**

"Making America Click" will be the keynote for the annual congress of American industry to be held Dec. 7-9 at New York by the National Association of Manufacturers.—**Page 64.**

A $4,000,000 plant expansion, involving building of three new factories giving jobs to 1000, is announced by Lewis H. Brown, president, Johns-Manville Corp.—**Page 64.**

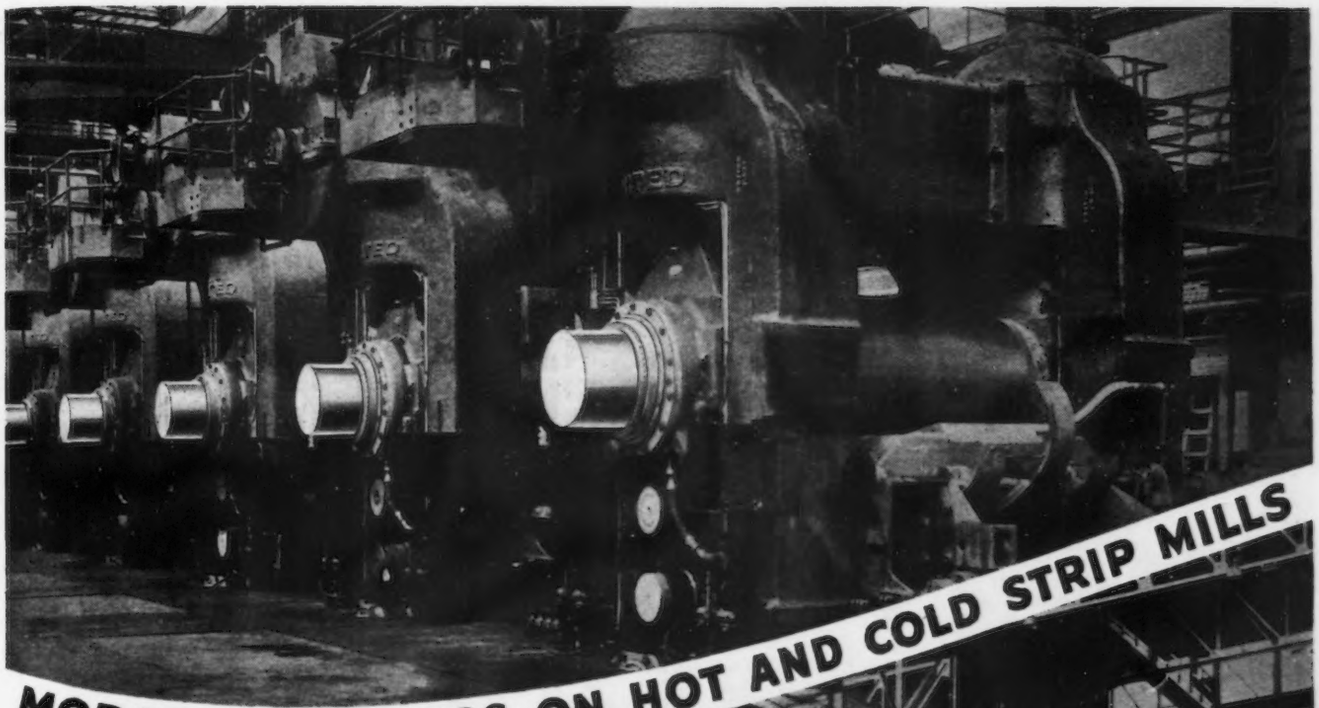
Industrial strife undermines confidence and dynamites the road to prosperity, Charles R. Hook, president of the National Association of Manufacturers, says.—**Page 64.**

Construction contracts in 37 Eastern states next year may reach a total of $3,500,000,000, F. W. Dodge Corp. predicts.—**Page 64.**

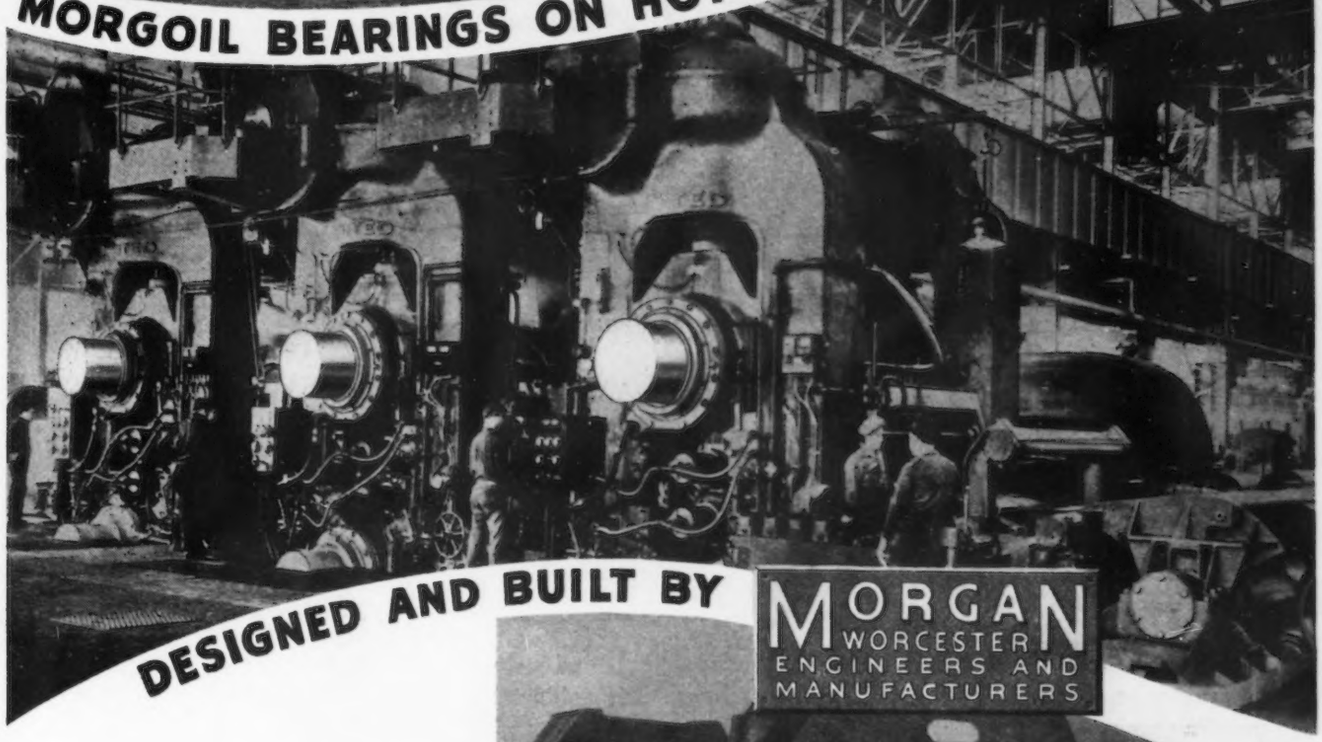
Thirty-ninth convention of the International Acetylene Association will be held March 9-10 at Houston, Tex.—**Page 65.**

Public Contracts Board report reveals split among board members in recommendations for steel industry wage minimums.—**Page 66.**

Clerical workers employed by Carnegie-Illinois Steel Corp. at Gary, Ind., organize the Association of Steel Clerks, with 225 enrolled.—**Page 81.**

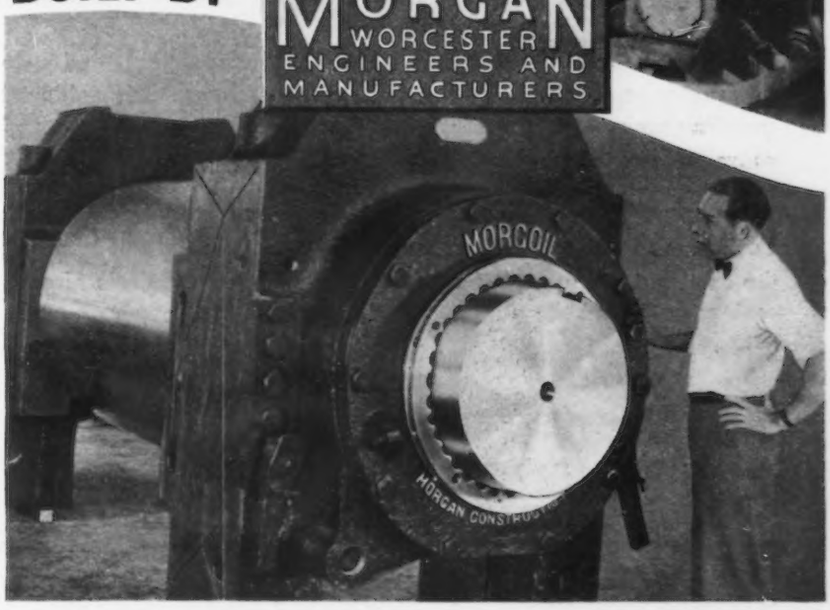


MORGOIL BEARINGS ON HOT AND COLD STRIP MILLS



DESIGNED AND BUILT BY MORGAN

WORCESTER
ENGINEERS AND
MANUFACTURERS



Strip rides on Series 50"-90 MORGOILS in one of the largest mills ever built. Eighty-eight of these bearings, each with a capacity of 4,050,000 lbs., were provided for the hot and cold strip mills shown above. An unbroken film of oil, on mirror finished surfaces, minimizes friction and wear, assuring economy of power.

Top view shows MORGOILS in the Hot Mill; middle view in the Cold Mill; while bottom view shows two smaller MORGOILS supporting a roll 49" diameter, 96" face. MORGAN CONSTRUCTION COMPANY, Worcester, Mass.

R 41-B

. . . PERSONALS . . .

A. W. HERRON, JR., who has been manager of wire sales since 1935 for the Jones & Laughlin Steel Corp., Pittsburgh, has been appointed manager of warehouse sales. Prior to that he had been district sales manager at Cincinnati for a number of years. He is succeeded as manager of wire sales by J. E. TIMBERLAKE, who started with the company in 1919 and has been in the wire sales department since 1925.

HENRY M. REED, president of the Standard Sanitary Mfg. Co., has been elected president of the parent company, American Radiator & Standard Sanitary Mfg. Co., succeeding CLARENCE M. WOOLLEY. Mr. Woolley has resigned as president and chairman after having been with the company and its predecessors for 50 years, because "The time has come when I desire to be relieved from the duties and responsibilities of office, that they may be taken over by younger men."

ROLAND J. HAMILTON will continue as president of the American Radiator Co. and as vice-president, secretary and treasurer of the American Radiator & Standard Sanitary Corp.

A. W. HERRON, JR.

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FRANK A. FREY has been elected president and treasurer of the Geuder, Paeschke & Frey Co., Milwaukee, filling the vacancy caused by the death of Charles Paeschke, Jr. Mr. Frey is the son of the late F. J. Frey, one of the founders of the company and chair-

J. E. TIMBERLAKE

man of the board of directors at the time of his death in 1937. He joined the firm in 1913 following his graduation from the University of Wisconsin and has had experience in all departments of the business. HENRY F. MILLMAN, vice-president in charge of production, has been elected executive vice-president and general manager. AUGUST K. PAESCHKE, son of the late president, and grandson of Charles A. Paeschke, who founded the company with Mr. Geuder and Mr. Frey, has been reelected secretary.

H. M. REED

ROBERT A. PETERSON has been appointed superintendent of the salvage department, J. DONALD ROLLINS, assistant chief estimator in the engineering department, and ROBERT E. DITTRICH, assistant to divison superintendent of coke plant and blast furnaces, Gary works, Carnegie-Illinois Steel Corp.

Mr. Peterson first started with United States Steel Corp. subsidiaries in 1934 as rolling mill adviser for the American Steel & Wire Co. after four years as manager of heavy mill sales for Aetna Standard Engineering Co. and 10 years as superintendent of erection for Morgan Construction Co. In 1936 he joined the Gary works organization as assistant superintendent of the merchant, wheel and axle mills and a year later he was made superintendent of the merchant bar mill, the position he held until the present time.

Mr. Rollins was employed in 1934 as a junior draftsman and estimator by the American Sheet & Tin Plate Co., Pittsburgh. Going to Carnegie-Illinois in 1936, he was employed as an estimator for approximately a year in the Pittsburgh office until his transfer to Gary works in the same capacity. He held this position until his recent appointment.

Mr. Dittrich began work as a clerk in the industrial relations department at Gary works in 1930 and remained in that capacity until his present promotion.

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GEORGE E. DIX, president of Steel Union-Sheet Piling Inc., 75 West Street, New York, will retire at the end of the year. For the past 12 years he has represented the United Steel Works of Germany in this country in the capacity of distributer of its various lines of steel products. Mr. Dix introduced to the American market

deep arch steel sheet piling which revolutionized the type of piling formerly made here. Starting in the steel business in 1907 with the Carnegie Steel Co., after previously spending 12 years in the textile business, he later was connected with the Central Steel Co. at Massillon, Ohio, the Midvale Steel & Ordnance Co. at Philadelphia, and the Consolidated Steel Corp., the latter having been the export medium for the principal steel independent steel companies after the War. He plans to retire entirely from business and will make his home in Virginia.

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HAROLD S. CARD, for the past two years director of the business development program of the electric welding section of the National Electrical Manufacturers Association, has inaugurated a sales, advertising and general promotional consulting service for manufacturers of welding equipment and materials. Mr. Card's new address is Room 517, 30 Church Street, New York.

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GUNTHER A. JACOBS, resident manager in Detroit for the Firth-Sterling Steel Co., McKeesport, Pa., has been elected vice-president of the company and will make his headquarters at the company's new warehouse and sintered carbide plant at 8330 West Chicago Boulevard, Detroit.

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DONALD B. GILLIES, vice-president, Republic Steel Corp., Cleveland, has been elected president of the American Institute of Mining and Metallurgical Engineers. JAMES T. MACKENZIE, metallurgist and chief chemist of the American Cast Iron Pipe Co., Birmingham, and chairman of the Iron and Steel Division of the A.I.M.E., has been elected a director for 1939.

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LEWIS B. SWIFT, heretofore vice-president in charge of engineering and research of the Taylor Instrument Companies, Rochester, N. Y., has been made president, succeeding HERBERT J. WINN, who has become chairman of the board. KARL H. HUBBARD has been appointed chief engineer, in charge of engineering research and design, and DR. H. L. MASON will succeed him as head of the research division. Mr. Swift has been identified with the company since 1904.

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H. S. NORTON will retire from active service as vice-president of the Gary Land Co., Nov. 27, under the United States Steel Corp. pension plan. He has served 39 years with

subsidiary companies of the steel corporation.

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EDWARD G. BURGESS, superintendent of the Toronto, Ont., works of the Massey-Harris Co., has been appointed general superintendent of the United States plants of the company at Racine, Wis., and Batavia, N. Y.

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DONALD A. ROBISON, who has been treasurer of the Caterpillar Tractor Co., Peoria, Ill., has been appointed general sales manager. He has been identified with the company for the past 12 years.

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WALTER JEHU, formerly general manager of the Timken Roller Bearing Co., Ltd., Toronto, Ont., has been made district manager of the Timken Roller Bearing Co.'s Boston, Mass., office.

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WALTER C. RUECKEL, who has been with the Koppers Co. for the past three years, has joined the staff of Battelle Memorial Institute as research engineer.

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W. H. RODGERS, who has been identified with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., since 1922, has been appointed engineering manager of the Eastern district, succeeding R. E. POWERS, who has been made Northwestern district service manager.

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GEORGE H. SPENCER, for the past three years general manager of E. D. Jones & Sons Co., Pittsfield, Mass., has joined the Bantam Bearings Corp., South Bend, Ind., to take charge of the New England district. He is a graduate of Stevens Institute of Technology.

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MORRIS KAFKER, Boston manager for Luria Brothers & Co., Inc., has been elected president of the Boston chapter of the Institute of Scrap Iron and Steel.

Still Another NLRB Decision Favors CIO

WASHINGTON. — Upon the basis of a stipulation agreed to by all parties the National Labor Relations Board has announced that it has ordered the Meadville Malleable Iron Co., Vernan, Pa., to end efforts to discourage self-organization of its employees, to cease giving effect to contracts now in existence between the company and the Meadville Malleable Iron Brotherhood, and to completely disestablish the Brotherhood.

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ADVERTISERS INDEX

Occupational Disease Laws Increasing, Executives Hear

PITTSBURGH. — More than 250 executives of 125 companies throughout the United States met here last week at the third annual meeting of the Air Hygiene Foundation at Mellon Institute, a non-profit organization for the advancement of health of industrial workmen, to hear current and future problems of industrial health.

"A steady job, decent hours with good pay, is no longer the sole criterion," V. P. Ahearn, executive secretary, National Industrial Sand Association, Washington, told members. He said, "To that must be added industrial health. It is often characteristic of Government that when it swings with the pendulum, it swings too far and thus aggravates rather than cures. Unwise occupational disease laws have been written, but who can deny that there is an irresistible trend toward the enactment of such laws in every State? Those laws are responsive to the apprehension of employees about health hazards in industry and industry will do well if it recognizes that fact and meets it intelligently."

New Legislation Expected

Further occupational disease legislation is expected in various states during 1939, according to Theodore C. Waters, chairman, Maryland Occupational Disease Commission, who said "twenty-one states have laws compensating disabilities arising from occupational diseases and, as we look forward to the legislative sessions of 1939, there will undoubtedly be additional states that will enact laws providing some form of compensation. The laws already enacted have given rise to various controversial questions affecting the relationship of employers and employees, while their present and future administration will create further problems."

Theodore F. Hatch, New York State Division of Industrial Hygiene, New York, discussed the method by which his state prepares and promulgates industrial codes. He paid tribute to forward-looking industrial establishments by flatly stating that experience in New York shows that the code requirements of the state never quite catch up with the standards established in the best industrial companies.

Codes Need Full Support

Emphasizing industry's place in code-making, Mr. Hatch said "in order to avoid the mistakes arising out of the lack of complete information with respect to the problems of the industry, it is essential that the code-making body has the fullest cooperation of the industry involved."

Codes cannot be applied in industry in every case without interfering with production, Mr. Hatch told members. He said he believed that progressive plant managers welcomed proper applications of regulations, since they tend to raise the standards of less progressive members of the industries and thus more nearly bring them in line.

Fleet of 8000 Planes for U. S. Visualized by Louis Johnson

AN American air fighting force consisting of possibly 8000 airplanes was visualized last week by Louis Johnson, assistant secretary of war, in an address at the Industrial Session of the 14th annual New England Conference.

"Yesterday," said Mr. Johnson, "we believed that a program calling for 2320 airplanes of all types by 1940 would protect us against any enemies from the air. Today, these figures are far below our immediate needs. Not so long ago we boasted that our Air Corps was the pride of the skies. We held records for speed and endurance. Our pursuit ships, our attack planes, our flying fortresses and our super-flying fortresses were the envy of the world.

"Today, we no longer can make good our boast. To meet the tremendous pace that the rest of the world is setting, we must double, yes, treble, and perhaps even quadruple our present air force with the best airplanes that can possibly be produced."

Great Britain spent $15,000,000, France $10,000,000 and Germany and Italy unknown amounts of money last year in research laboratories on military aeronautics, while the United States spent only $6,000,000, Mr. Johnson said.

Columbia Machine Tool Acquires New Plant

COLUMBIA MACHINE TOOL CO., Hamilton, Ohio, has acquired and is placing into production the plant of the Long & Allstatter Co., according to an announcement by F. B. Yingling, president. The plant will manufacture punches, shears, presses and other metal working equipment.

Two New Steel Freight Cars Shown

AMERICAN CAR & FOUNDRY CO. has developed two new designs of modern light-weight welded steel freight cars. A 50-ton all-welded alloy steel box car and a 40-ton welded-riveted refrigerator car will start on an exhibition tour on Nov. 12.

Low alloy high-tensile corrosion-resisting steel has been used to the fullest extent practicable in both types of cars. The light weight of the box car is 37,500 lb. and that of the refrigerator car 44,200 lb. This represents a reduction in weight of approximately four tons in each design.

New developments incorporated in the all-welded box car include steel ends with extra long corrugations extending around the body end posts, steel doors of increased rigidity, and a new design of underframe having integral all-welded construction. New developments in the welded-riveted refrigerator car, in addition to those mentioned above include ice bunker, ice hatch, removable steel bulkhead, a unique and very efficient application of insulation, and a new and economical method of using dry ice in combination with water ice.

"Make America Click" Keynote for N.A.M.

NEW YORK.—Under the leadership of Charles R. Hook, president of the National Association of Manufacturers and president of the American Rolling Mill Co., and with "Making America Click" as their keynote, manufacturers from all sections of the country will gather here Dec. 7, 8 and 9 for the annual Congress of American Industry sponsored by the association.

Among those who will speak are Senator Burke of Nebraska, who will discuss "The Third Party to Industrial Strife"; Senator O'Mahoney of Wyoming, chairman of the Temporary Economic (Monopoly) Committee, who will talk on "Regulation of Business Competition;" Secretary of War Woodring, who will speak on "The Manufacturer and National Defense"; and former U. S. Senator Henry J. Allen of Kansas.

Administrator Elmer Andrews will discuss the new wage-hour law.

1939 Building Contracts May Reach 3½ Billions

CONSTRUCTION contracts to be let in the 37 Eastern states during 1939 may reach a total of $3,500,000,000, according to estimates released by F. W. Dodge Corp. This figure would compare with an estimated total of $3,200,000,000 for 1938, and an actual total of approximately $2,900,000,000 in 1937. None of these figures include repair and maintenance work.

This national construction news organization points out that the total building and engineering volume recorded from Jan. 1 through Nov. 15 of this year reached a total of $2,635,000,000 compared with $2,599,000,000 in the corresponding period of 1937, and anticipates that considerable letting of public works contracts before the end of this year will materially increase the spread between the final 1938 and 1937 figures.

Strikes Dynamite Road To Recovery, Hook Warns

REMOVAL of compulsion and coercion from management-employee relations as the road to industrial peace was urged this past week by Charles R. Hook, president of the National Association of Manufacturers and of the American Rolling Mill Co.

"Industrial strife undermines the confidence of the people," said Mr. Hook. "It contributes to depressions and dynamites the road to prosperity." Waves of strikes and the unchecked use of the sit-down weapon were among the major causes for the precipitous decline of business activity in 1937, he said.

Johns-Manville Plans $4,000,000 Expansion

JOHNS-MANVILLE CORP. will build three new factories, costing about $4,000,000 and giving work to 1000 men, at Jarratt, Va., Watson, Cal., and Richmond, Ind., during the next year, Lewis H. Brown, president, announces.

The Virginia factory will start early in 1939 to make insulating board and other products, the California unit manufactures rock-wool home insulation, and the Indiana plant will turn out stone felt, a recently developed insulation for railroad cars, mechanical refrigerators, automobiles and airplanes.

Applying Electric Furnace Brazing Metals

(CONTINUED FROM PAGE 33)

A representative mixture consists of:

1 gal. pyroxylin solution, 8.4 lb.
1 gal. thinner, 8 lb.
copper powder, 38 lb.

TOTAL—54.4 lb.

In general, any good clear lacquer or pyroxylin solution with a good thinner is suitable. Typical products which have been used with success are as follows:

Pyroxylin Solution

Pyroxylin solution, No. XL-459, made by the Zapon Division, Atlas Powder Co., Stamford, Conn.

Thinner

Thinner, No. B-432, made by the Monsanto Chemical Co., Merrimac Division, Everett Station, Boston.

Copper Powder

Copper powder, 150 mesh, made by: Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.

Charles Hardy, Inc., 415 Lexington Avenue, New York.

Metals Disintegrating Co., Townley, N. J. P. O. Box 290, Elizabeth, N. J.

As a substitute for the copper paste described above, one manufacturer mixes copper powder with mineral spirits and applies the mixture with an oil can. The copper powder adheres to the steel well enough to be handled around the shop with care, but the coating is more fragile than when made with pyroxylin solution. The advantages of using mineral spirits are low cost and cleanliness of surfaces after brazing. With this material it is necessary, of course, to keep the mixture well agitated to retain the copper powder in suspension.

Another manufacturer uses ordinary machine oil for suspending the copper powder, and applies drops of this mixture to the work through a spout in the bottom of an agitator bowl. Other manufacturers sometimes suspend the copper powder in water or alcohol.

(TO BE CONTINUED)

Walter E. Dubard and **Walter Moore**, representatives of the Manhattan Rubber Manufacturing Division and I. B. Williams & Sons, have moved their Detroit offices from 5185 Loraine Avenue to 222 E. Milwaukee Avenue. They carry a line of vee belts, transmission and conveyor belting, rubber products, hose and molded goods.

Acetylene Association to Meet at Houston, Tex.

THE 39th convention of the International Acetylene Association is to be held at Houston, Tex., March 8, 9 and 10, 1939. Headquarters will be at the Rice Hotel. A program covering the most important developments in the application of oxy-acetylene welding and cutting is being arranged.

In announcing the unanimous decision of the officers and directors, H. F. Reinhard, secretary of the association, referred to the splendid convention of the I.A.A. in Birmingham last year, the first in the South, and also to the numerous requests received during recent years to visit the Southwest. The headquarters of the association are at 205 East 42nd Street, New York.

Reports Shows Contracts Board Split on Steel Wage Minimums

WASHINGTON.—The Public Contracts Board, prompted by numerous requests for the full text of its recommendations for fixing minimum steel wages, released the full 144-page report on Saturday and at the same time announced that the time for filing protests against the recommendations has been extended to Dec. 10.

The report, described by Chairman Holland as the most comprehensive steel wage picture ever compiled by any Government department, disclosed that Board Member O. R. Strackbein wrote a dissenting opinion in which he recommended a 56½c. minimum rate for mills in the East, as compared with the 62½c. minimum suggested in the majority opinion written by Chairman Holland. The dividing line between East and West would run just west of Altoona, in central Pennsylvania. Hence, under the minority recommendations eastern Pennsylvania, Maryland, Delaware, New Jersey, New York and all of New England would have a 6c. differential with such further exceptions, Strackbein said in obviously referring to the possibility of differentials for smaller plants, "as may be provided for through special exemptions or limitations."

Mr. Strackbein, who throughout the public hearings expressed an interest in permitting differentials for small plants, declared in his dissent that the forcible merging of the Eastern with the Western section, as proposed by a majority of the board, would introduce "a reallocation of comparative competitive advantages not in accordance with the object of the law, not confined to the end that objectionable competition would be eliminated but with the effect that an unearned and gratuitous advantage would be given to one area at the expense of another."

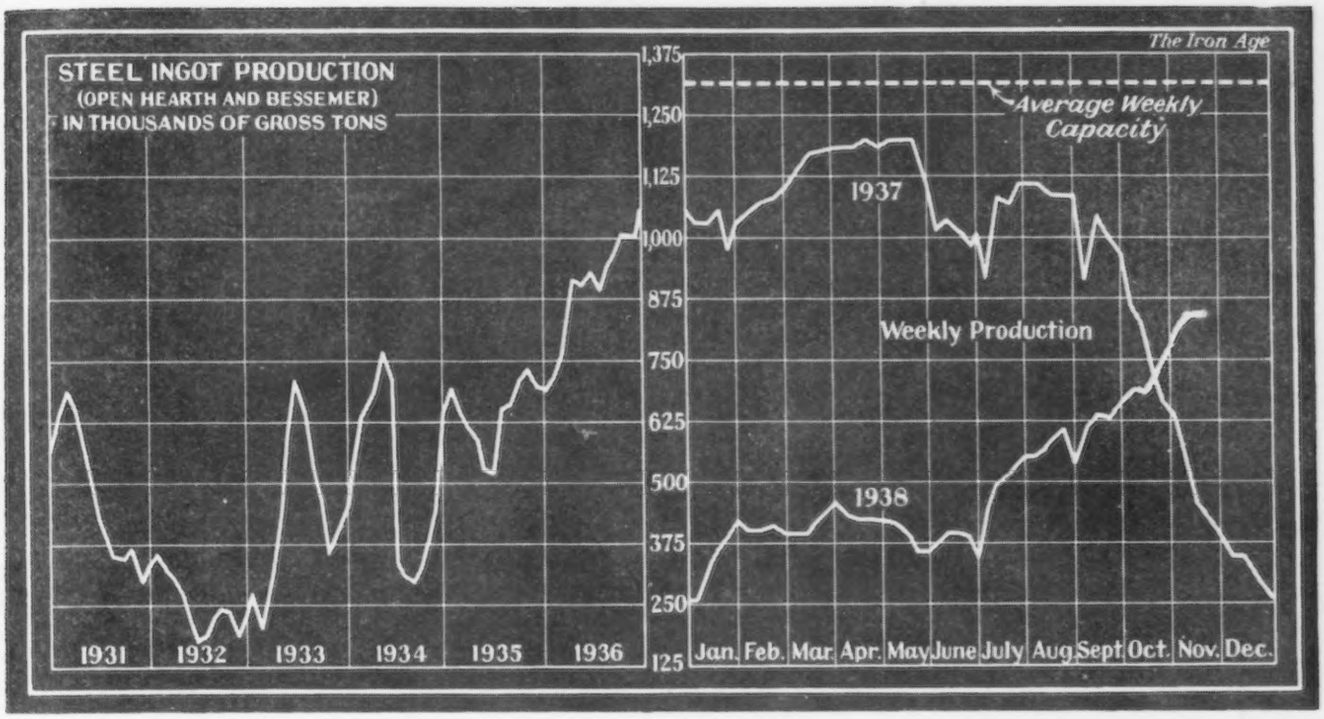
In his seven-page dissent, Strackbein turned aside the SWOC contention made at public hearings that the Bethlehem Steel Corp., enjoys a competitive advantage because of payment of lower wages. He pointed out that the evidence failed to establish such to be a fact, and that the allegation was categorically denied in the brief filed by the company. The minority opinion also recommended a 55c.-minimum for Missouri, western Kentucky, southern Indiana and southern Illinois; and a 60c.-minimum wage rate for mills in the Far West. Mr. Strackbein concurred with the other two board members in their recommendations for a 45c. minimum wage rate in the South.

Not Wage-Lifting Act

"The Public Contracts Act," Strackbein said, "is not a wage-raising act as such. Such increases in wages as may be required as a result of minimum wage determinations under it are incidental to its principal purpose.

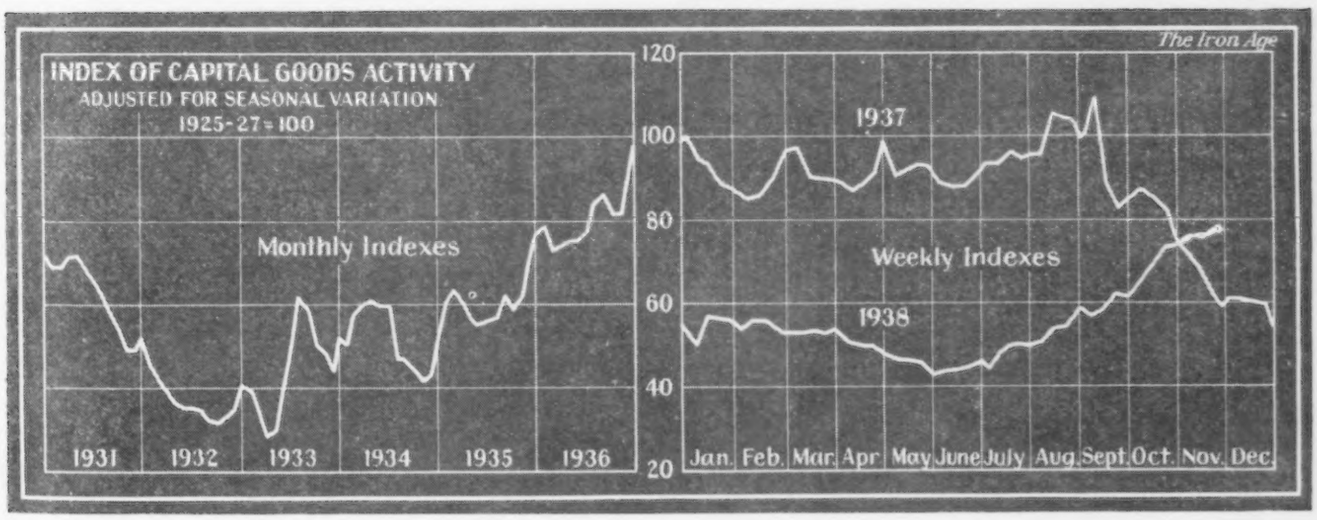
Meanwhile, the Apollo Steel Co., Apollo, Pa., was the first to protest against the board's recommendation. The letter said that the company cannot pay more than 53c. an hour for common labor, the rate paid at present, and that to raise the rate to 62½c., as suggested by the board, would make it "disastrous for us to bid on any further Government work."

Ingot Output Down One Point to 61.5 Per Cent



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Wheeling	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	48.0	58.5	63.0	37.0	74.0	83.0	49.0	85.5	60.4	64.0	40.0	56.2	75.0	**61.5**
PREVIOUS WEEK..	50.0	60.5	66.0	37.0	74.0	93.0	49.0	85.5	56.0	64.0	40.0	58.5	75.0	**62.5**

Improvement in Every Component Boosts Index to 77.7



A GENERAL improvement throughout the index, ranging from 0.9 point in the steel output series to 4.8 in the automobile production factor, boosted THE IRON AGE index of capital goods activity to 77.7 for the week ended Nov. 19, a gain of 1.4 points over the position of the preceding week and representing a rate of activity 26 per cent higher than in the corresponding week of 1937. The gain in automobile assemblies for the week was greater than the seasonal trend for the first time in four weeks and was the largest weekly gain since the week of Oct. 15, at which time assemblies of the new models were just beginning to get under way.

	Week Ended Nov. 19	Week Ended Nov. 12	Comparable Week 1937	Comparable Week 1929
Steel ingot production[1]	90.4	89.5	49.7	102.2
Automobile production[2]	93.9	89.1	83.2	81.0
Construction contracts[3]	80.0	77.7	54.4	110.3
Forest products carloadings[4]	55.2	54.4*	53.8	115.0
Production and shipments, Pittsburgh District[5]	69.2	65.9	66.7	108.5
Combined index	**77.7**	**75.3***	**61.6**	**103.4**

* Revised.

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot output off slightly; steel scrap at new high.

° ° °

. . . Pressure for rush shipments to auto makers eases.

° ° °

. . . Trade pact may aid American steel in Canada.

THE usual year-end cautiousness of steel buyers is seemingly beginning to manifest itself. New orders are holding up fairly well, but November will not show important gains over October. There is no fear that production will fall off sharply during the few remaining weeks of the year, but there may be no further substantial rise unless some prices should be advanced for the first quarter, a possible development regarding which there is no certainty at the moment.

Price announcements for the first quarter are logically to be expected within the next week or two, but there is no intimation as to whether any mill will attempt an advance. Opinion in the trade seems to be divided as to the advisability of such action, notwithstanding the desire of all producers for a better return. A fairly likely possibility is the reduction or elimination of quantity allowances, which on 150-ton orders of some products amount to $3 a ton.

Ingot production at mid-week is estimated at 61.5 per cent, down one point from last week. In the Birmingham district there was a gain of one open-hearth furnace, but elsewhere operations have either declined or remained at the previous week's rates. In four of the principal districts, Pittsburgh, Chicago, Youngstown and Wheeling-Weirton, operations are lower.

Some of the recent upward trend in ingot production was due to a rush of specifications from the automobile industry, which, gaging its assemblies to retail sales, had apparently underestimated the public interest in the new cars. Now that shipments of cars are beginning to catch up, the pressure from this source may not be quite so insistent, although further large specifications are expected before the end of the year.

Sheet and strip rollings against recent large commitments are the most important factor in current ingot output. Specifications against these commitments have not been made in full as some users apparently covered for more than they will be able to use or pay for. Mills are of course insisting that unspecified tonnages shall be canceled at the end of the quarter.

WHILE there is room for doubt as to whether steel production will make much, if any, further gain this year, trade opinion is fairly confident of a considerable improvement in 1939 over the present year. The 1938 total of open hearth and Bessemer ingots probably will be about 28,500,000 tons; estimates of 1939 production place the minimum at about 40,000,000 tons. This is largely based on known factors, such as a sharp gain in automobile assemblies, a larger tin plate output, a considerable volume of specifications for building projects that have been awarded or will be awarded under the Government program, and the possibility that some workable plan will be found by which railroad rehabilitation, now regarded as an essential feature of the Government's armament program, can be carried out. The armament program itself will be a factor. The award of three battleships assures the use of 33,000 tons of plain steel and 42,000 tons of armor plate, some of which will be required next year, and the award of six cargo ships will add upward of 25,000 tons of steel to next year's shipbuilding needs.

Structural steel lettings are not up to expectations, having amounted to only 16,000 tons in the week, with a little more than 24,000 tons coming out for bids. The Navy Department is an important factor in current awards and inquiries.

Tin plate production has not yet been stimulated by the recent reduction of $7 a ton, but can companies are releasing larger quantities of rolled plate from mill warehouses.

TARIFF concessions made to the United States under the Anglo-American trade pact are likely to result in larger participation by this country in Canadian steel and machinery business. Some Canadian interests may carry a protest to Ottawa. The benefits to the United States in Great Britain will be largely in certain types of machinery.

STEEL scrap prices at Pittsburgh and Chicago have moved up, raising THE IRON AGE composite price to $15, a new high for the year, but there are signs of a slightly easier situation at Chicago, which may indicate a checking of the rise for the present at least.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.35	$5.35

*Pittsburgh prices only.

Pig Iron

Per Gross Ton:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.76
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.26
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Heavy melting steel, P'gh.	**$15.50**	$15.375	$14.75	$13.25
Heavy melting steel, Phila.	14.75	14.75	14.75	13.75
Heavy melting steel, Ch'go.	**14.75**	14.50	13.00	11.75
Carwheels, Chicago	13.00	13.00	13.25	14.50
Carwheels, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	16.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.25	11.50

Coke, Connellsville

Per Net Ton at Oven:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.25
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, *1937
Electrolytic copper, Conn.	**11.25**	11.25	11.25	10.75
Lake copper, New York	11.375	11.375	11.375	12.125
Tin (Straits), New York	*46.00*	46.50	46.50	41.625
Zinc, East St. Louis	*4.75*	5.05	5.05	5.50
Zinc, New York	*5.14*	5.44	5.44	5.85
Lead, St. Louis	4.95	4.95	4.95	4.85
Lead, New York	5.10	5.10	5.10	5.00
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	15.75

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
November 22, 1938	2.286 a Lb.	$20.61 a Gross Ton	$15.00 a Gross Ton
One week ago	2.286	20.61	14.88
One month ago	2.286	20.61	14.17
One year ago	2.512c.	23.25	12.92

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	$15.00, Nov. 22	$11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 16
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

. . THIS WEEK'S MARKET NEWS . .

STEEL OPERATIONS

. . . Country-wide average down a point to 61.5%

STEEL ingot production at mid-week is estimated by THE IRON AGE at 61.5 per cent, down one point from last week. The estimate issued on Monday by the American Iron and Steel Institute was 61.9 per cent.

Operations are lower in four of the most important districts. The PITTSBURGH rate is down two points to 48 per cent; the WHEELING-WEIRTON district is seven points lower at 83 per cent; the CHICAGO district has declined two points to 58.5 per cent (two plants losing and three gaining), and the YOUNGSTOWN area is three points lower at 63 per cent. Only in the BIRMINGHAM district is there a gain, to 60.4 per cent.

The CLEVELAND-LORAIN rate is unchanged at 74 per cent, and other districts which are unchanged are BUFFALO, DETROIT, EASTERN PENNSYLVANIA, SOUTHERN OHIO and some of the smaller districts.

NEW BUSINESS

. . . Buying loses some of its recent briskness

CURRENT volume of new business at PITTSBURGH is not up to expectations. Discounting automotive support, demand is not as brisk as a month ago. Part of this cautious movement may be attributable to consumers' desires to keep inventories to the bone as the year-end approaches.

New business at CLEVELAND has tapered slightly since the middle of the month. This condition is not disturbing, however, and has been encountered in previous years toward the latter part of November. While incoming orders are well diversified as to consumers, mills producing merchant bars, tubular goods and wire and tin plate still have considerable room on their books for additional business. Sheet and strip production continues strong. Pig iron shipments show promise of edging ahead of the volume for October, due to the requirements of a few large special consumers.

A leading CHICAGO seller is confident of seeing some fairly good sheet purchases in December by motor car builders and general consumers. Bar sales are reflecting higher Detroit production and, next to sheets and strip, are CHICAGO sellers' most active line. Midwest producers expect heavier bookings of structural shapes in the near future and the same holds true of reinforcing bars, despite the lateness of the year.

Tin plate sales have not been greatly accelerated by the recent reduction in price.

Only the possibility of a first quarter price advance can provide the remainder of 1938 with important sales stimulation, is the general opinion of sales officials. Other factors are not considered of sufficient importance to be of much influence, barring unforeseen international developments.

At BIRMINGHAM there is a very satisfactory flow of new tonnage. Sheets, wire products and structural shapes are the most active. The outlook for bar and structural tonnage is exceedingly bright owing to a large increase in construction projects now being awarded or pending.

In the ST. LOUIS area, new business is light. New business at PHILADELPHIA in some offices does not equal the volume for last month whereas some offices report about the same volume as in October.

NEW YORK district sales are holding up well, but are not gaining over October as that month gained over September.

PRICES

. . . Announcement for first quarter is awaited

ANNOUNCEMENT of prices for first quarter is expected soon. Discussion of the possibility of higher prices is heard in the trade, but no definite information is available. While some in the trade look for moderate increases on certain products, such action cannot be considered by any means as a foregone conclusion.

Some steel sales executives are confident that there will be no major price changes in the next quarter, but there is a bare possibility of revision or elimination of quantity allowances. If there is any price revision, it will be modest.

Weakness in prices is most pronounced in fabricated structural steel and reinforcing bars. In products in which the resale market is not an important factor there is a much firmer situation than in those in which jobbers handle a considerable part of the tonnage.

PIG IRON

. . . Anglo-American pact reduces duty on low phosphorus iron

THE only grade of pig iron to be affected by the recently signed Anglo-American trade pact is iron with a maximum phosphorus content of 0.04 per cent, on which the duty on shipments from the United Kingdom to the United States has been lowered from $1.125 to 75c. per ton. There has been no movement of this type of iron into the United States for a number of years and present demand is not considered sufficient to encourage imports.

Domestic pig iron buying is in small amounts as most users have enough iron still due them on contracts to take care of their requirements over the remainder of the year.

Shipments, however, are gaining moderately in some districts. At CHICAGO, for example, they were up 22 per cent in the first 16 days of November, according to some estimates, but were still only 45 per cent of what is considered a normal volume. For the entire month of November, shipments from CHICAGO furnaces may not be more than 10 per cent above the October total.

From furnaces in the PITTSBURGH, CLEVELAND and YOUNGSTOWN districts, shipments this month have improved a little. The gains are due largely to the requirements of a few special classes of foundries such as automotive, sanitary ware and heating lines, as general jobbing trade has not picked up materially in recent weeks. At CINCINNATI machine tools and automotive business account for a good share of the iron consumption. Stove plants are an important factor at ST. LOUIS, but some of these are planning to shut down about Dec. 1 until the second week in January.

In the East the situation is some-

what spotty. In the NEW YORK district releases against contracts are tapering off. In NEW ENGLAND some foundries have fair business while others are quite slack. Export shipments against old orders are as much of a factor in the PHILADELPHIA area as domestic business.

No intimation has been given as to pig iron prices for the first quarter, but it is believed that no change will take place.

IRON ORE

. . . Lake Superior stocks 38,593,569 tons on Nov. 1

OCTOBER consumption of Lake Superior iron ore increased by 466,720 gross tons over the amount used in September, according to the Lake Superior Iron Ore Association. The October total of 2,780,585 tons compares with 2,313,865 tons in the previous month and 4,203,873 tons in October, 1937. On hand at Lake Erie docks and furnaces Nov. 1 were 38,593,569 gross tons compared to 37,873,559 tons on Oct. 1 and 43,266,427 tons on Nov. 1, 1937. There were 88 furnaces depending partially on Lake Superior ore in blast Oct. 31, against 76 one month earlier and 120 a year ago.

PLATES

. . . Demand is not showing much, if any, improvement

PLATE tonnage is not gaining much, if any, this product being one of the dullest in the steel list. Government awards of battleships and cargo boats are an encouraging factor, but the steel requirements for these ships are for the future. Railroad buying is chiefly for repairs and in small quantity.

It is definitely reported from CHICAGO that the Illinois Central Railroad will not build 1000 cars in its own shops, as reported last week, but will probably place this order with car builders if a decision is reached to go ahead.

The initial section of the new CHICAGO subway will take 3000 tons of liner plates instead of 500 tons, as mentioned last week.

The Metropolitan Water District, LOS ANGELES, will take bids Dec. 12 for more than seven miles of 22, 31 and 37-in. plate-fabricated pipe for the Colorado River aqueduct laterals. Welded steel pipe and concrete pipe are alternates.

SEMI-FINISHED STEEL

. . . Specifications are in fairly good volume

SPECIFICATIONS continue in fairly good volume at PITTSBURGH. Bookings in the past week were in line with recent weekly averages. A slight leveling off in business is expected unless prices should be advanced in the near future.

STRUCTURAL STEEL

. . . Contract for 2000-ton bridge goes to Bethlehem

STRUCTURAL inquiries and awards are not coming out as fast as had been expected. Prices are reported unimproved. A 2000-ton bridge over the Missouri River at Brownsville, Neb., went to Bethlehem Steel Co. The CHICAGO area reports bids have been taken on an 1800-ton bridge at Waurika, Okla., and 700 tons of shapes will be needed for station construction in the first section of the Chicago subway (bids due Dec. 1).

Awards in the NEW YORK area, although fairly numerous, were below the previous week's level on a tonnage basis, the largest letting involving 1000 tons for viaduct repairs in Hoboken, N. J., going to American Bridge Co. New inquiry includes 3700 tons for a section of the Delaware Aqueduct. Bids on the Meeker Avenue bridge project in Brooklyn, calling for 18,000 tons, are being readvertised. Cauldwell-Wingate Construction Co., New York, was low bidder on recent bids on a ventilating building for the Queens Midtown tunnel. Structural requirements of this job are estimated at 1100 tons.

Structural specifications at PITTSBURGH show little change in volume. Some jobs, it is reported, may be lost unless approvals can be obtained within the next six weeks.

At PHILADELPHIA a considerable decline is noted in projects coming up for estimation, reflecting completion of the current construction program at the Navy yard, with little activity in eastern Pennsylvania construction looked for until spring.

Bethlehem Steel Co. was low bidder on the WEST COAST for 12,000 tons to be used in transmission towers of the Los Angeles Department of Water & Power. American Bridge Co. was low bidder on two bridges totaling 975 tons for the Southern Pacific track relocation around Shasta Dam. A large shop building at the Mare Island, Cal., Navy yard, on which preliminary estirates range from 3500 to 6000 tons, will be bid Dec. 14. Another shop to be built by the Navy at Alameda, Cal., will take about 2500 tons, with bids due Dec. 21. Western Pipe & Steel Co. of California, Los Angeles, has been awarded 1350 tons for a Navy hangar at San Clemente Island, Cal., while 1187 tons for Mississippi State bridges has gone to the Vincennes Bridge Co., Vincennes, Ind.

ST. LOUIS fabricating plants, operating below a third of capacity, are making a few purchases of shapes. An auditorium at Topeka, Kan., will require 500 tons.

WIRE PRODUCTS

. . . Rural buying has increased at Chicago

TOTAL wire sales at PITTSBURGH so far this month approximate tonnages booked in the like October period. Merchant wire demand has quieted down some in the past few weeks, while manufacturers' wire continues to derive major support from the automotive industry. There is a possibility that wire nail extras will be revised in the near future based on actual increased operating costs. The last major revision was made in 1927.

At CLEVELAND the rate of incoming business, which had been steady for approximately two months, showed signs of slackening late last week. Sellers pointed out it was too early to indicate any trend. Demand for normalized wire has taxed the facilities of some OHIO producers so greatly that delivery promises are extended four weeks. This is a direct reflection of automotive buying. Straight manufacturers' wire is available in 10 days or two weeks. With the time approaching for a price announcement for first quarter, some wire producers hold firmly to the opinion that no change is likely in base quotations at this time.

Good demand from automobile manufacturers and an increasing interest in merchant trade products are providing CHICAGO wire sellers with cause for optimism. In the past three weeks

rural buying has increased, and it is estimated that fully 65 per cent of the farm consumers in that territory have covered their needs for the remainder of 1938. A continuation of this trend is anticipated well into next year.

SHEETS AND STRIP

. . . Production continues at high rate . . . More specifications expected

ALTHOUGH mills are continuing to bring pressure on their customers for rolling specifications against low-priced commitments, it has not been easy in all cases to obtain the full amounts for which some buyers protected themselves. It appears that many buyers covered for more than they can consume during the next month or two and some are hesitant about increasing inventories too much at the year-end; questions of credit and the tying up of too much capital in stocks have also deterred some users from specifying in full. However, most mills have ample backlogs for the next few weeks. Deliveries range from two to five or six weeks on hot rolled and from three to 12 weeks on cold rolled, depending on the mills.

Automotive, household appliance and miscellaneous manufacturers are furnishing the bulk of the current tonnage.

Opinion seems to be divided in the trade as to what action, if any, should be taken on prices for sheets and strip for the first quarter. All sellers recognize the necessity for a higher yield per ton, but some contend this should be accomplished through revision or elimination of quantity allowances rather than by additions to base prices. Certain consumers are definitely sympathetic on the subject of a price advance.

Some in the trade believe that further important automotive buying will be seen before the year end.

RAILROAD BUYING

. . . Inquiry for 400 cars issued by Wheeling & Lake Erie

WHEELING & LAKE ERIE RAILROAD's inquiry for 400 hopper cars, requiring approximately 6000 tons of steel, was a highlight this week of a market which found both steel producers and railroad leaders reasonably confident that a fair amount of railroad buying will materialize early in 1939.

Seaboard Air Line has placed an order with the Tennessee Coal, Iron & Railroad Co. for several hundred thousand tie plates and announced it expected to purchase a substantial tonnage of rails around Jan. 1, while the Smoky Mountain Railroad has applied for a $40,000 RFC loan, partly for purchase of rails. The Board of Public Service of St. Louis will receive bids Dec. 16 on a $336,000 project providing interlocking and signaling equipment for the railroad deck of the Municipal bridge across the Mississippi River.

Cornwall Railroad has ordered 20 ore cars from Bethlehem Steel Co. The Navy Department is asking for bids on two box cars and two flat cars. Youngstown Steel Car Co., Youngstown, reports its order backlog totals $500,000. Santa Fe Trails Transportation Co. has awarded an order for 40 air conditioned motor coaches to the a.c.f. Motors Co.

BOLTS, NUTS, RIVETS

. . . Automotive buying brings operating gain at Cleveland

OPERATIONS of producers in the CLEVELAND district show a good sized gain over October, due to an increase in demand, particularly from the automotive industry.

REINFORCING BARS

. . . George Washington Bridge takes 500 tons; inquiries gain

WITH inquiries and awards reflecting slightly heavier tonnages at some points, the NEW YORK area reported the award of 500 tons for an approach to the George Washington Bridge going to Igoe Bros., Newark, N. J., and found that pending projects including 1000 tons of mesh and bars for New York State highway work are now in the hands of general contractors.

Sweet's Steel Co., Williamsport, Pa., will furnish 500 tons for a Parcel Post Office at Providence, R. I. In the CLEVELAND district the largest project pending is the Sandusky, Ohio, filtration plant, requiring 415 tons of rail steel bars. Other than 3500 tons of bars for the first section of the Chicago subway (bids due Dec. 1), few large jobs are in prospect in the CHICAGO area where, however, a good volume of projects requiring less than 100 tons of bars have been reported.

The PHILADELPHIA area shows little activity with expected improvement this fall failing to materialize, partly because New Jersey highway construction has been very limited and because of Pennsylvania's difficulty in obtaining money for its construction program. Prices submitted by distributers at PHILADELPHIA on recent jobs have shown no improvement. PITTSBURGH finds slightly higher going prices on concrete bars at some locations. BUFFALO district schools will take small tonnages of bars shortly.

In the SAN FRANCISCO area the Bureau of Reclamation seeks bids on 1354 tons of bars for Shasta Dam on Nov. 28, and 850 tons on Nov. 30 for Grand Coulee Dam. Bids will be taken Dec. 9 on the Bonneville Dam powerhouse, requiring 3240 tons, and the Palos Verdes reservoir, Los Angeles, requiring 1000 tons. The Central Valley Project, Redding, Cal., will take 1354 tons, bids due Nov. 26.

A hospital building in ST. LOUIS will require 150 tons, and 635 tons are included in Arkansas drainage projects.

TIN PLATE

. . . Operations up slightly . . . Releases have improved

TIN plate operations are estimated at 30 to 35 per cent. Releases of material already rolled have improved some and miscellaneous bookings are slightly more active. The bulk of new business is expected to materialize after the first of the year.

MERCHANT BARS

. . . Demand is steady with inventory season a factor

HOT rolled bar demand in PITTSBURGH is about on a par with a week ago, with automotive interests furnishing major support. Hand-to-mouth buying continues with some consumers purchasing only minimum requirements in an effort to end the year with low inventories. A moderate advance in price, however, could completely change this picture.

Bar mills in OHIO still have considerable room on their books for additional business. Demand from Nov. 14 to 21 proved weaker than in the preceding period, despite a fair

volume of moderate-sized orders from machinery manufacturers.

Of chief importance at the moment next to sheets and strip in CHICAGO steel sales offices are bars, active mostly because of purchases from makers of cars and parts; bars also are in demand by industrial tractor manufacturers and a host of miscellaneous consumers. Farm implement and tractor operations still are not showing much of an increase.

. CAST IRON PIPE .

. . . New England buying has been fairly substantial

NEW ENGLAND representatives of pipe foundries, according to common talk at the meeting of the New England Water Works Association in BOSTON last week, were decidedly more optimistic than those from other sections of the country.

New England pipe foundries have substantial backlogs and the outlook for further business is quite bright. During the past few days municipalities have been releasing some orders, and the glut of orders on books may be substantially relieved before the close of November. The Everett, Mass., foundry of the Warren Foundry & Pipe Corp. continues to operate on a five-day per week schedule.

TUBULAR GOODS

. . . Standard pipe gaining . . . oil country sales slow

AGGREGATE tubular sales at PITTSBURGH have changed but little in the past week. Oil-country goods demand is slower but standard pipe requirements continue to reflect moderate improvement. Outlook for oil-country requirements will not be clarified much before the end of the year when 1939 oil company budgets are completed.

In the CLEVELAND district the largest outstanding inquiry is for an Akron, Ohio, pipe line calling for 380 tons of 24-in. and 30-in. steel pipe or 825 tons of cast iron pipe. Steel & Tubes, Inc., Cleveland, division of Republic Steel Corp., has been awarded approximately 800 tons of 1-in. o.d. pipe by the Federal Reclamation Bureau, Washington.

SHIPBUILDING

. . . Battleships to take 75,000 tons of steel . . . Six cargo ships awarded to Federal

APPROXIMATELY 33,000 tons of plain steel and 42,000 of armor plate will be required for three 35,000-ton battleships ordered by the Navy Department last Saturday, two to be built in private yards and one, the *Alabama,* to be constructed in the Norfolk, Va., Navy Yard. One vessel, the *Indiana,* was awarded to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., at $49,540,000. To the Bethlehem Shipbuilding Corp., Quincy, Mass., was awarded a contract to construct the *Massachusetts,* at $49,815,000. The bid prices do not cover costs for propelling machinery, armament, guns and ammunition, but are subject to adjustments for changes in cost of labor and material during the period of construction. It is estimated that armament, guns and ammunition will cost $26,000,000 for each dreadnaught. The *Indiana* is to be delivered in 52 and the *Massachusetts* in 55 months. Awarding of a contract for a fourth 35,000-ton ship, the *South Dakota,* was delayed because the Navy Department considered that the bid was too high. The three new ships, it is officially estimated, will provide jobs for about 18,000 skilled craftsmen.

The Maritime Commission on Monday awarded a $14,658,000 contract to the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., for the construction of six C-3 steel cargo ships. The vessels will require a total of 26,220 tons of steel. The award brings the total of new ships built under the commission's program this year to 43, or within seven vessels of the minimum annual quota. Still under consideration are other bids on C-3 cargo ships, several on the C-3 combination passenger-cargo ships and bids on three special combination ships for the Mississippi Shipping Co.

The awarding of a battleship contract to the Bethlehem Steel Co.'s shipbuilding division, Quincy, Mass., means five to six years of employment to approximately 7000 workmen.

Market Sidelights

Seaboard Steel Products Co., New York, has booked a $200,000 order for steel casement windows for the Queensbridge housing project, New York. The windows will be manufactured by the Thorne Window Co., Philadelphia.

* * *

Announcing plant extensions involving outlay of $25,000, Lewis Wilkoff, vice-president, Youngstown Steel Car Co., Youngstown, Ohio, said the company has an order backlog of nearly $500,000.

* * *

A new store building, for F. W. Woolworth & Co., is to be built in Birmingham, at a cost of more than $400,000. Work will start about Jan. 1.

* * *

T. A. Loving & Co., Goldsboro, N. C., has been awarded a contract by the Alabama Highway Department for the construction of a concrete and steel highway bridge over the Alabama river at Selma, on a bid of $647,666.

* * *

Re-employment of 2000 workers this week has been announced by the Norge Refrigerator Corp., Muskegon, Mich. Four hundred employees were ordered to return to work Monday. The factory has been virtually closed for several weeks.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 22, 1938	Nov. 15, 1938	Oct. 25, 1938	Nov. 23, 1937	1938	1937
Fabricated structural steel awards	16,000	17,700	33,350	6,500	803,645	982,885
Fabricated plate awards	1,140	1,545	2,080	800	118,505	124,965
Steel sheet piling awards	890	400	800	0	44,590	57,580
Reinforcing bar awards	3,200	4,750	8,200	4,375	296,440	256,965
Total Letting of Construction Steel..	21,230	24,395	44,430	11,675	1,263,180	1,422,395

FABRICATED STEEL

NORTH ATLANTIC STATES

AWARDS

1000 Tons, Hoboken, N. J., Fourteenth Street viaduct, to American Bridge Co., Pittsburgh; George M. Brewster & Sons, Inc., general contractor.

900 Tons, Providence, R. I., parcel post building, to Phoenix Bridge Co., Phoenixville, Pa.; George A. Fuller Co., Boston, contractor.

390 Tons, Union Bridge, Md., Lehigh Portland Cement Co. buildings, to Belmont Iron Works, Philadelphia.

370 Tons, New York, contract HRB-35, approach to George Washington bridge, to American Bridge Co., Pittsburgh.

346 Tons, Allendale, N. J., Erie Railroad bridge, to American Bridge Co., Pittsburgh; George M. Brewster & Sons, Inc., general contractor.

340 Tons, Clifton, N. J., State highway bridge, to American Bridge Co., Pittsburgh; Franklin Contracting Co., general contractor.

300 Tons, Croydon, Pa., State bridge over Neshaminy Creek, to American Bridge Co., Pittsburgh.

275 Tons, New York, loading platform and bridge to land plane administration building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

200 Tons, Pittsburgh, repairs to Bloomfield bridge, to Levinson Steel Co., Pittsburgh.

200 Tons, North Branch, Md., State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

175 Tons, Gardiner-Randolph, Me., bridge, to Lackawanna Steel Construction Corp., Buffalo.

170 Tons, Elmira, N. Y., alterations, Elmira Free Academy, to American Bridge Co., Pittsburgh.

160 Tons, Boston, cupola building and runway, Griffin Wheel Co., to A. O. Wilson Structural Co., Boston.

105 Tons, Roscoe, N. Y., Central School, to Bethlehem Contracting Co., Bethlehem, Pa.

100 Tons, Windsor, Vt., high school, to Lehigh Structural Steel Co., Allentown, Pa.

100 Tons, Gardner, Mass., City Hall, to Haarmann Steel Co., Holyoke, Mass.; Swanberg Construction Co., Manchester, N. H., contractor.

THE SOUTH

1187 Tons, State of Mississippi, bridges to Vincennes Bridge Co., Vincennes, Ind.

970 Tons, Waller County, Tex., bridge, to Virginia Bridge Co., Roanoke, Va.; Brown & Root, Inc., Houston, general contractor.

465 Tons, Norfolk, Va., mess hall and school, to Lehigh Structural Steel Co., Allentown, Pa. Virginia Enginering Co., general contractor.

400 Tons, Lexington, Ky., science building, to International Steel Co., Evansville, Ind.; Gilson Taylor Co., general contractor.

370 Tons, Chaison, Tex., Case structure, to Mosher Steel Co., Houston, Tex.; E. E. Badger & Sons Co., contractor.

270 Tons, Fort Myer, Va., warehouse for War Department, to Fort Pitt Bridge Works Co., Pittsburgh.

170 Tons, Fort Knox, Ky., children's school, to Snead Architectural Iron Works, Louisville, Ky.; Alex Bornstein, general contractor.

140 Tons, Maverick County, Tex., bridge to Mosher Steel Co., Houston, Tex.; through M. E. Worrell Co., Austin, Tex.

135 Tons, Eleanor, W. Va., textile plant, to Ingalls Iron Works Co., Birmingham; George F. Hazlewood, general contractor.

125 Tons, Burgaw, N. C., building for Panderlea Mfg. Co., to an unnamed fabricator, through Irwin-West Construction Co.

120 Tons, Berkeley Springs, W. Va., high school, to an unnamed bidder.

CENTRAL STATES

2000 Tons, Brownsville, Neb., bridge over Missouri River, to Bethlehem Steel Co., Bethlehem, Pa.

655 Tons, Dearborn Co., Ind., highway bridge, to Midland Structural Steel Co., Cicero, Ill.; A. G. Ryan & Son, general contractors.

365 Tons, Chicago, addition to Murray F. Tuley High School, to Vierling Steel Works, Chicago.

320 Tons, Fort Riley, Kan., academic building for U. S. Army, to Omaha Steel Works, Omaha, Neb.

270 Tons, Whiting, Ind., building for Standard Oil Co. of Indiana, to Mississippi Valley Structural Steel Co., St. Louis.

200 Tons, Waupaca County, Wis., bridge, to Worden-Allen Co., Milwaukee.

166 Tons, Chippewa Falls, Wis., bridge, to Clinton Bridge Works, Clinton, Iowa.

160 Tons, York, Neb., highway bridge, to St. Joseph Structural Steel Co., St. Joseph, Mo.

115 Tons, Cleveland, building for Greyhound Bus Lines, to Rogers Structural Steel Co., Corry Pa., through National Concrete Fireproofing Co., Cleveland.

WESTERN STATES

1350 Tons, San Clemente Island, Cal., Navy Department hangars, to Western Pipe & Steel Co. of California, Los Angeles; through Los Angeles Contracting Co., contractor.

186 Tons, San Francisco, George Washington High School gymnasium, to Judson-Pacific Co., San Francisco; through Meyer Construction Co., San Francisco, contractor.

112 Tons, East Ely, Nev., overpass, to Bethlehem Steel Co., San Francisco, through Fredericksen & Westbrook, Sacramento, Cal., contractors.

CANAL ZONE

269 Tons, Coco Solo, Canal Zone, hangar extension, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

18,000 Tons, Brooklyn, Meeker Avenue Bridge, bids being readvertised by Department of Public Works, New York, closing on Nov. 28.

3700 Tons, Fishkill, N. Y., contract No. 319, Delaware Aqueduct; bids received by Department of Water Supply, New York, until Dec. 6.

1200 Tons, Auburn, N. Y., commercial and technical junior-senior high schools.

1100 Tons, Queens, N. Y., ventilating building, Queens Mid-town tunnel, Cauldwell-Wingate Construction Co., New York, low bidder on construction contract.

920 Tons, Brooklyn, public school No. 221, Bethlehem Fabricators, Inc., Bethlehem, Pa., low bidders.

500 Tons, Baltimore, laboratory building, Bressler Memorial for University of Maryland.

450 Tons, Monmouth County, N. J., Oceanic bridge over Shrewsbury River; bids soon.

250 Tons, New York, seaplane ramp, North Beach Airport.

250 Tons, Laurel Hill, N. Y., building for Phelps Dodge Corp.

200 Tons, Washington, intersection stations.

200 Tons, Wilkes-Barre, Pa., school; bids Dec. 5.

150 Tons, Bartlett, N. H., State brideg.

125 Tons, Argyle, N. Y., central school.

125 Tons, Waverly, N. Y., senior high school.

100 Tons, Standish-Hollis, Me., bridge.

100 Tons, Philadelphia, school at 22nd and Norris Streets; bids Nov. 30.

THE SOUTH

1780 Tons, Waurika, Okla., highway bridge; bids in.

250 Tons, Dallas, Tex., school building; bids in.

165 Tons, Covington, Ky., Fourth District School.

CENTRAL STATES

1500 Tons, Rantoul, Ill., air corps school buildings, Chanute Field; reported last week as unstated tonnage; bids Dec. 1.

700 Tons, Chicago, stations for first section of subway; bids Dec. 1.

510 Tons, Oshkosh, Wis., Wisconsin Avenue bridge; bids Nov. 29.

500 Tons, Topeka, Kan., auditorium.

450 Tons, Terre Haute, Ind., student union building for Indiana State Teachers College.

400 Tons, Des Moines, Iowa, State bridge.

300 Tons, Chicago, Monroe Street garage; Carson, Pirie, Scott & Co.; bids Nov. 29.

300 Tons, Benkelman, Neb., State bridge, project 41.

275 Tons, Sandusky, Ohio, waterworks; bids taken Nov. 22.

265 Tons, Benkelman, Neb., State bridge, project 439.

265 Tons, Nielsville, Minn., bridge; bids in.

180 Tons, Bayfield County, Wis., grade separation; bids taken Nov. 18.

170 Tons, Benkelman, Neb., State viaduct, project 41.

165 Tons, Fargo, N. D., State bridge.

WESTERN STATES

4500 Tons, Mare Island, Cal., Navy shop; bids Dec. 14.

2500 Tons, Alameda, Cal., Navy shop; bids Dec. 21.

837 Tons, Roswell, N. M., culverts and bridges; bids in.

300 Tons, St. Joe, Idaho, St. Joe River bridge for U. S. Forest Service; bids in.

133 Tons, Pompey's Pillar, Mont., overpass; bids Nov. 29.

100 Tons, Wolf Point, Mont., underpass; bids Nov. 29.

FABRICATED PLATES

AWARDS

375 Tons, Bradley Hills, Md., standpipe, to Chicago Bridge & Iron Works, Chicago.

323 Tons, Greensboro, N. C., pipe line, to unnamed fabricator.

300 Tons, Owensboro, Ky., elevated tank, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

140 Tons, Hoboken, N. J., caissons for Fourteenth Street viaduct, to National Tube Co., through George M. Brewster & Sons, Inc., general contractor.

NEW PROJECTS

100 Tons, Norwood, Mass., water tank.

Unstated tonnage, Los Angeles, 4.7 miles of 37-in., 1.2 miles of 31-in., and 1.3 miles of 22-in. welded pipe for Metropolitan Water District (concrete alternate) (Specifications 293); bids Dec. 12.

Unstated tonnage, Sacramento, Cal., water tank lining; bids Dec. 16.

SHEET PILING

AWARDS

600 Tons, New York, bulkhead, 82nd Street to Bowery Bay, divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh.

172 Tons, Belmont County, Ohio, State work, to Bethlehem Steel Co., Bethlehem, Pa., through Rice Bros., general contractor.

112 Tons, Cleveland, East Ninth Street bridge, to Carnegie-Illinois Steel Corp., through National Engineering & Contracting Co., general contractor.

NEW PROJECTS

2000 Tons, Jackson County, Ark., flood wall and railway track reconstruction; bids at Little Rock, Ark., Nov. 29.

1000 Tons, Jefferson County, Ark., drainage distribution; bids at Little Rock, Ark., Nov. 29.

300 Tons, Marked Tree, Ark., St. Francis drainage project; List & Weatherly, Kansas City, Mo., low bidders on general contract.

. . . NON-FERROUS . . .

. . . Cut in duty on zinc imports spurs $6 reduction in domestic price . . . Export copper sags to 10.52c.; domestic quotations unchanged in a dull market.

AS a direct result of the Anglo-American trade pact which lowered the import duty $6 a ton on zinc ore and $7 a ton on slab zinc, domestic producers reduced quotations on prime Western metal $6 a ton on Monday in a move to discourage imports. The new price of 4.75c. per lb., East St. Louis, brings prices back to the level of the summer months. None of the other major non-ferrous metals were affected by the agreement. Following a week of heavy buying, spelter sales in the past week were very light, totaling only 3203 tons, all done on the basis of 5.05c., East St. Louis. The market is currently very inactive, purchases being limited to imperative needs.

Copper

COPPER sentiment in the past week turned from extreme optimism in the early part of the week to aggressive bearishness as the week ended. Chief cause of this change was the sharp drop in the export price from 11c. on Nov. 15 to 10.52c. on Monday. The weak undertone that characterizes the market at present has caused a sharp contraction of both purchases and specifications. Although the domestic producers' price remains unchanged at 11.25c. per lb., Connecticut Valley, for electrolytic metal, there has been some business done in the open market at prices under 11c.

The tendency of the LEAD market to react sympathetically to the weakness in copper and zinc has been counteracted by the very favorable October statistics. These figures show deliveries of 45,700 tons, production of 32,000 tons and a decline of 13,875 tons to 117,476 tons in reserves, the lowest since November, 1937. The fact that all of November's and at least 50 per cent of December's requirements have been already covered limits current business to routine carlots. Quotations are very firm at 4.95c. per lb., St. Louis.

Tin

A fairly active demand for futures from the TIN plate makers in the past week was nullified by further weakness in the stock market and additional declines in the Sterling rate, causing Straits tin quotations to continue the downward trend of the past three weeks. Tuesday's Straits quotation in New York, of 46c. per lb., represents a net loss of ½c. from the price of Tuesday a week previous. Outside of the tin plate makers, little consumer interest is in evidence.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 16	Nov. 17	Nov. 18	Nov. 19	Nov. 21	Nov. 22
Electro, copper[1]	11.25	11.25	11.25	11.25	11.25	11.25
Lake copper	11.375	11.375	11.375	11.375	11.375	11.375
Straits, tin, New York	46.55	46.30	46.25	46.00	....	46.00
Zinc, East St. Louis[2]	5.05	5.05	5.05	5.05	4.75	4.75
Lead, St. Louis[3]	4.95	4.95	4.95	4.95	4.95	4.95

[1] Delivered Conn. Valley, deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

	New York	Cleveland
Tin, Straits pig	47.25c.	50.25c.
Copper, lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.50c.	17.50c.
*Seamless brass tubes	20.25c.	20.25c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	13.375c.	13.375c.
Zinc slabs	6.50c.	7.50c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.875c.	5.60c.
Lead, bar	6.625c.	8.75c.
Lead sheets, cut	8.25c.	8.25c.
Antimony, Asiatic	15.00c.	17.75c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	29.125c.	30.00c.
Babbitt metal, commercial grade	23.00c.	22.75c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.75c.	9.50c.
Copper, hvy. and wire	7.75c.	8.25c.
Copper, light and bottoms	7.00c.	7.25c.
Brass, heavy	4.75c.	5.25c.
Brass, light	3.875c.	4.625c.
Hvy. machine composition	7.00c.	8.50c.
No. 1 yel. brass turnings	4.50c.	5.00c.
No. 1 red brass or compos. turnings	6.75c.	7.375c.
Lead, heavy	4.00c.	4.875c.
Cast aluminum	7.50c.	8.75c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.50c.	3.75c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 12.25c. a lb. QUICKSILVER, $72-$73 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.25c. a lb. lcl.

. . . PIPE LINES . . .

Mar-Tex Pipeline Co., Texas City, Tex., a subsidiary of Mar-Tex Oil Co., same place, has purchased an existing 4-in. welded steel pipe line in Dickenson oil field, Galveston County, Tex., extending to Gillock, Tex., thence to bulk terminal at Texas City. Extensions and improvements are planned for connection with other crude oil pipe lines of company.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., closes bids Nov. 28 for 1240 ft. of black steel pipe (Circular 376).

Anadarko, Okla., will ask bids soon on steel pipe line and alternate figures on cast iron pipe from main water wells to filtration plant, in connection with extensions and improvements in water system; also for distributing line, extensions and replacements, purification equipment and other waterworks installation. Cost about $243,800. Bond issue has been voted for part of sum, remainder to be secured through Federal aid. Robert O. Bradley, Chickasha, Okla., is consulting engineer.

Bureau of Reclamation, Denver, asks bids until Dec. 1 for two 96-in. ring-follower gates and two sets of steel conduit units for installation in outlet works at Wickiup dam, Deschutes project, Ore. (Specifications 812).

IRON AND STEEL SCRAP

. . . Pittsburgh and Chicago markets display additional strength . . . Eastern quotations hold gains as export buying continues . . . Composite price advances 12c. to $15 a ton, a new high level for 1938.

SCRAP markets all over the country are showing either strong or mixed trends, although it is evident that an underlying uncertainty continues to confuse operators. Some brokers and a number of consumers have adopted a cautious and waiting attitude, and are for the most part prone to delay action until the clarification of the trend in steel making after the turn of the year.

At Pittsburgh, consumers have paid $16 for representative lots of No. 1 steel, and prices as high as $15 have appeared in Chicago. At Philadelphia, the absence of domestic buying support placed the $15 price there under some pressure, but more activity in export is serving to support the list pricewise to some extent. The small upward revisions in Pittsburgh and Chicago serve to add 12c. to the national composite price, lifting the average to $15, a new high level for 1938, and comparing with the low point for the year of $11 during the week of June 7.

Pittsburgh

The market continues to present a complex situation, No. 1 steel being obtained in small lots by consumers at $15 a ton in the immediate Pittsburgh district while at other points in the district at least $16 a ton into consumption is being paid. Brokers' prices run the full range of $15 to $16. A representative spread in No. 1 heavy melting steel is considered to be $15 to $16 a ton, an increase of 12½c. a ton from last week's average price for this grade. The market continues strong with no signs of weakness.

Chicago

Broker-dealer trading resulted in $15 being paid for heavy melting steel and reports of $15.25 early this week. Considerable steel was sold, it is understood, at these levels, and now the market is much easier, it being said that $14.75 is a sufficient offering price. With the last mill sale still that of last week at $14.75, quotations this week are unchanged, except that No. 1 and shoveling are listed at a flat $14.75.

Philadelphia

This market continues to depend entirely on export purchases for support. Domestic mills here are seemingly disinterested in taking on forward commitments, and are even hesitant about releasing shipments against old orders. There is little likelihood of the operating rate in eastern Pennsylvania showing much additional improvement over the remainder of the year, and for that reason brokers here have little hope of appreciable price improvement in scrap until the production trend for 1939 is more clearly discernible. Several brokers are now purchasing export material here, and the price has advanced 50c. to near $14.50 for No. 1 and $13.50 for No. 2 steels. One boat is expected in within several days for a partial cargo, and at least three boats are scheduled to dock in December. Some brokers along the Atlantic Seaboard are adopting restrictions against the shipment of material to Germany, and it is possible that this situation will develop additional force over the next fortnight.

Youngstown

Shipments in this vicinity have been light during the past week. Because not much scrap is moving, sentiment has taken a turn for the worse, but so far has not been reflected in lower quotations.

Cleveland

Sentimentally the market appears a little weaker this week, probably due to slackened shipments. The local market awaits a clew as to the outlook for the immediate future in the activity of other districts. One buyer here who is understood to be well protected for at least two months in advance is frankly holding off in the expectation that prices will turn downward.

Buffalo

In a return to the market after an extended absence the main consumer of the district made a sizable purchase this week. The sale consisted of approximately 7000 tons of No. 2 hydraulic bundles at a price of $11 to $11.50. Several sizable sales have been made in the past few weeks and the market is beginning to have a stronger tone. Dealers' stockpiles have been materially reduced by the orders.

St. Louis

Covering of short interests by dealers and the prospect of buying by a leading mill during the week have caused scrap iron prices again to advance. Selected heavy melting, and Nos. 1 and 2 heavy melting, miscellaneous standard section rails, heavy turnings, rails for rolling, No. 2 railroad wrought, and brake shoes advanced 25c. a ton, and railroad springs, and No. 1 machinery cast 50c. Railroad lists: Chicago, Burlington & Quincy, 4811 tons; Chicago, Rock Island & Pacific, 4322 tons; Chicago, Milwaukee, St. Paul & Pacific, 1133 tons; Missouri-Kansas-Texas, 925 tons.

Cincinnati

The old materials market is stronger. Dealers' bids are broader with a general increase through the list. Some quiet mill buying is reported while foundries are more receptive to purchasing. Dealers indicate further increase in bidding to attract sufficient material to cover anticipated buying.

Detroit

Reflecting the conditions of a more active market locally and higher prices in other markets, Detroit has seen greater strength in May scrap classifications, ending the sidewise price movement which has prevailed for weeks. Borings and turnings continued to show an improvement with the prevailing quotations increased 25c. over last week. A slight scarcity in auto cast is reported to have been an important factor in boosting the price on that item to $13.50 to $14. Unconfirmed rumors that hydraulic compressed sheets on a body company's list brought about $12.85 lent a degree of strength to this item, but the most recent bids on which there is accurate information places this item at $12.25 maximum. Because the major consumer in this area has changed specifications on the No. 1 heavy melting grade of scrap, the quotation hereafter will read "No. 1 heavy melting steel, industrial," which at present is being bought by dealers at $10.75 to $11.25.

Boston

Bundled skeleton is 50c. a ton higher following a rise in No. 1 heavy melting steel at Pittsburgh, making a net gain the past fortnight of 90c. a ton. Otherwise domestic delivered scrap prices are nominal and unchanged. Providence barges are being loaded with blast furnace material, destination not stated, the first of such material to be moved in this territory in some time. The New Haven Railroad has asked bids on 45 miles of abandoned rails, and the sale hinges on permission by the I.C.C. Exporters are busy on old contracts. Three steamers have left here for Italy with 13,409 tons, one stopping at Searsport, Me., for 1600 tons additional. A boat started loading here Nov. 21, another starts Nov. 25, five others within the next few weeks. No boat is loading at Providence, but two are due there within a fortnight. Providence exporters pay $10 a net ton for automobile scrap, or $11.20 a gross ton. Deducting handling and other charges leaves a slim margin of profit.

New York

Sporadic shipments are going into eastern Pennsylvania on old orders, but the attention of the trade is directed primarily toward export loadings. Attractive lots of No. 1 steel are bringing $12 a ton and over, delivered barge, and a $10.50 price on No. 2 is fairly common. The flow of material through local yards for processing is showing some improvement as prices slowly advance, but the volume being handled is still far under that of several years ago. No new orders for export were taken during the meeting with the cartel last week, but further negotiations are expected within the next month or so. Scrapping of the Sixth Avenue elevated line will probably be started early next year, and the entire operation will likely involve about 275,000 tons of iron and steel.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $16.00
Railroad hvy. mltng..	15.75 to 16.25
No. 2 hvy. mltng. steel.	14.25 to 14.75
Scrap rails	16.00 to 16.50
Rails 3 ft. and under..	17.00 to 17.50
Comp. sheet steel	15.00 to 16.00
Hand bundled sheets..	14.25 to 14.75
Hvy. steel axle turn..	13.75 to 14.25
Machine shop turn....	8.50 to 9.00
Short shov. turn.....	9.75 to 10.25
Mixed bor. & turn....	8.25 to 8.75
Cast iron borings.....	8.25 to 8.75
Cast iron carwheels...	14.50 to 15.00
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	15.25 to 15.75
RR. knuckles & cplrs.	16.50 to 17.00
Rail coil & leaf springs	16.50 to 17.00
Rolled steel wheels...	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Low phos. punchings..	16.50 to 17.00
Low phos. plate	16.50 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.00 to 13.50
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old..	11.50 to 12.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	16.50 to 17.00
Hvy. breakable cast...	.... 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn....	8.00 to 8.50
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.00 to 10.50
No. 1 low phos. hvy...	16.50 to 17.00
Couplers & knuckles..	16.50 to 17.00
Rolled steel wheels ..	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	20.00 to 20.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	11.00 to 11.50
Cast borings (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	....	$14.75
Auto. hvy. mltng. steel alloy free	$12.75 to	13.25
No. 2 auto. steel	11.50 to	12.00
Shoveling steel	....	14.75
Factory bundles	13.25 to	13.75
Dealers' bundles	12.25 to	12.75
Drop forge flashings..	11.75 to	12.25
No. 1 busheling	12.75 to	13.25
No. 2 busheling, old...	6.50 to	7.00
Rolled carwheels	15.50 to	16.00
Railroad tires, cut....	16.50 to	17.00
Railroad leaf springs..	16.00 to	16.50
Steel coup. & knuckles	15.50 to	16.00
Axle turnings	13.00 to	13.50
Coil springs	17.00 to	17.50
Axle turn. (elec.)	14.00 to	14.50
Low phos. punchings..	16.50 to	17.00
Low phos. plates 12 in. and under	16.00 to	16.50
Cast iron borings	5.50 to	6.00
Short shov. turn.	7.25 to	7.75
Machine shop turn....	7.25 to	7.75
Rerolling rails	17.50 to	18.00
Steel rails under 3 ft..	16.00 to	16.50
Steel rails under 2 ft..	16.50 to	17.00
Angle bars, steel	15.50 to	16.00
Cast iron carwheels...	....	13.00
Railroad malleable	15.00 to	15.50
Agric. malleable	11.50 to	12.00
	Per Net Ton	
Iron car axles	19.50 to	20.00
Steel car axles	19.50 to	20.00
Locomotive tires	15.50 to	16.00
Pipes and flues	9.50 to	10.00
No. 1 machinery cast.	12.50 to	13.00
Clean auto. cast.	12.50 to	13.00
No. 1 railroad cast....	11.50 to	12.00
No. 1 agric. cast.....	11.00 to	11.50
Stove plate	8.50 to	9.00
Grate bars	8.50 to	9.00
Brake shoes	9.50 to	10.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Low phos. plate	16.00 to 16.50
No. 1 busheling	13.50 to 14.00
Hydraulic bundles	14.25 to 14.75
Machine shop turn....	9.75 to 10.25

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	14.00 to 14.50
Light bund. stampings	11.00 to 11.50
Drop forge flashings..	13.00 to 13.50
Machine shop turn....	7.00 to 7.50
Short shov. turn.....	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings....	11.00 to 11.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	7.75 to 8.25
Mixed bor. & turn....	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	16.50 to 17.00
Railroad grate bars ..	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable	15.00 to 15.50
Cast iron carwheels ..	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	12.00 to 12.50
Old hydraul. bundles..	11.00 to 11.50
Drop forge flashings...	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings....	10.50 to 11.00
Machine shop turn....	6.75 to 7.25
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.....	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	17.50 to 18.00
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	14.50 to 15.00
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$13.25 to $13.75
No. 1 hvy. melting....	13.25 to 13.75
No. 2 hvy. melting....	12.25 to 12.75
No. 1 locomotive tires.	13.25 to 13.75
Misc. stand. sec. rails.	13.75 to 14.25
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	4.00 to 4.50
Machine shop turn....	5.00 to 5.50
Heavy turnings	9.00 to 9.50
Rails for rolling	17.00 to 17.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought....	10.75 to 11.25
No. 2 RR. wrought....	13.25 to 13.75
Steel rails under 3 ft..	15.50 to 16.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast..	14.50 to 15.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast....	12.50 to 12.75
Stove plate	9.00 to 9.50
Grate bars	8.50 to 9.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$11.75 to $12.25
No. 2 hvy. mltng. steel.	9.50 to 10.25
Scrap rails for mltng.	15.50 to 16.00
Loose sheet clippings.	7.00 to 7.50
Hydrau. b'ndled sheets	11.25 to 11.75
Cast iron borings	4.50 to 5.00
Machine shop turn....	5.75 to 6.25
No. 1 busheling	8.25 to 8.75
No. 2 busheling	3.00 to 3.50
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires.	14.25 to 14.75
Short rails	18.00 to 18.50
Cast iron carwheels...	12.75 to 13.25
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast....	13.00 to 13.50
Burnt cast.	7.00 to 7.50
Stove plate	7.00 to 7.50
Agricul. malleable	12.00 to 12.50
Railroad malleable	14.50 to 15.00
Mixed hvy. cast	10.75 to 11.25

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast.	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$10.75 to $11.25
No. 2 hvy. mltng. steel.	9.00 to 9.50
Borings and turnings.	5.75 to 6.25
Long turnings	5.50 to 6.00
Short shov. turnings..	6.50 to 7.00
No. 1 machinery cast..	12.25 to 12.75
Automotive cast	13.50 to 14.00
Hvy. breakable cast...	9.75 to 10.25
Hydraul. comp. sheets.	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel...	10.75 to 11.25
Sheet clippings	8.50 to 9.50
Flashings	9.00 to 9.50
Low phos. plate scrap	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	12.00 to 12.50
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	10.00 to 10.50
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace...	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	$10.15
Machine shop turn....	.... 3.38
Mixed bor. & turn.....	$2.00 to 2.25
Bun. skeleton long....	.... 8.15
Shafting	10.25 to 10.50
Cast bor. chemical....	5.50 to 5.75
Per gross ton delivered consumers' yards:	
Textile cast	$12.50 to $14.50
No. 1 machine cast....	12.50 to 14.50

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$12.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.50	$9.00
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	7.00	6.50
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	3.50	3.00
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	10.00 to 10.50
No. 2 cast	.... 11.00
Stove plate	$10.00 to 10.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$13.25 to $13.50
No. 2 hvy. mltng. steel.	12.25 to 12.50
Rails (scrap)	.... 13.50
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.00 to 13.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS*

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

Black Plate

Pittsburgh, Chicago and Gary	3.15c.
Granite City	3.25c.
On cars dock Pacific ports, boxed	4.10c.

NOTE: No. 29 gage is heaviest in which tin mill black plate is sold, No. 28 and heavier taking sheet base. There are no gages which take the above base prices as extras are applicable in all cases.

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	4.40
Pittsburgh or Gary	$4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

HOT ROLLED STRIP

Prices F.o.b. Unless Otherwise Noted

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP**

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51 .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Barbed wire, galvanized	3.20
Twisted barbless wire	3.20
Woven wire fence, base column.	67
Single loop bale ties, base col...	56

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	56	36	¼ & ⅜	.+ 9	+30
¼ to ⅜	.59	43½	½	24	6½
½	....63½	54	¾	30	13
¾	....66½	58	1 & 1¼	..34	19
1 to 3	...68½	60½	1½	38	21½
			2	....37½	21

Lap Weld

2	61	52½	2	....30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6	..66	57½	4	....33½	21
7 & 8	..65	55½	4½ to 8.32	½	20
9 & 10	..64½	55	9 to 12	..28½	15
11 & 12	..63½	54			

Butt weld, extra strong, plain ends

⅛	....54½	41½	¼ & ⅜	.+10	+43
½ to ⅜	.56½	45½	½	25	9
½	....61½	53½	¾	31	15
¾	....65½	57½	1 to 2	...38	22½
1 to 3	...67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	....33½	18½
2½ &	63	55½	2½ to 4.39		25½
3½ to 6	..66½	59	4½ to 6.37	½	24
7 & 8	..65½	56	7 & 8	..38½	24½
9 & 10	..64½	55	9 to 12	..32	20½
11 & 12	..63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 3 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.79	10.23	$9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
2 in. o.d....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2½ in. o.d...12 B.W.G.	18.45	16.01	15.16
2½ in. o.d...12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d.... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d.... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Pet Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. & 6 in. and smaller.	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1⅛ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
¼ to 7/16 in. incl.	65-10	70-5
½ to 9/16 in.	65-5	70
⅝ to 1-in. incl.	60-10	65
1⅛ in. and larger	60-5	60-5

Beyond the above, an additional 10 per cent allowed for full container quantities.

Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham $3.40

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .... 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	70 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67½ and 10
Upset set screws, cup and oval points	75 and 10
Milled studs	60½ and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes.	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth.	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 5s.

CONTINENTAL

Per Gross Ton, Gold £.
f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown*	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa. Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio
Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, 1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs. nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3-unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports
Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore
Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13c.
Iron, low phos., Swedish, average, 68½% iron	15c.
Iron, basic or foundry, Swedish, aver. 65% iron	13c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	35c.
Man., African, Indian, 44-48%	33c.
Man., African, Indian, 49-51%	35c.
Man., Brazilian, 46 to 48½%	33c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$20.00
Tungsten, domestic, scheelite delivered	$19.00 to $20.00

Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African

(low grade)	15.00
Rhodesian, 45%	19.50
Rhodesian, 48%	23.00
Turkish, 48-49%	23.00 to 24.00
Turkish, 45-46%	19.00 to 20.00
Turkish, 40-44%	17.00 to 18.00

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

50%	26.00 to 27.00
48-49%	23.25 to 24.25

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal

No. 2 or diesel, f.o.b. Bayonne.	4.125c.
No. 6, f.o.b. Bayonne	2.26c.
Del'd Chicago, No. 5 Bur. Stds.	3.25c.
Del'd Chicago, No. 6 Bur. Stds.	2.75c.
Del'd Cleve'd, No. 3 distillate	5.50c.
Del'd Cleve'd, No. 4 industrial	5.25c.
Del'd Cleve'd, No. 5 industrial	3.00c.
Del'd Cleve'd, No. 6 industrial	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

REINFORCING STEEL

NORTH ATLANTIC STATES AWARDS

500 Tons, Providence, R. I., parcel post office, to Sweets Steel Co., Williamsport, Pa., through George A. Fuller Co., New York, contractor.

500 Tons, New York, approach, George Washington bridge, to Igoe Bros., Newark, N. J., through Wood & Hagen, New York.

350 Tons, Chester, Pa., sewage disposal plant, to Bethlehem Steel Co., Bethlehem, Pa., through Perry Construction Co., Atlantic City, N. J., contractor.

290 Tons, Wildwood, N. J., boardwalk, to Truscon Steel Co., Youngstown.

246 Tons, Cumberland County, Pa., construction of section 19, Turnpike, Pennsylvania State Highway Department, to Bethlehem Steel Co., through L. M. Hutchinson, Mount Union, Pa., contractor.

175 Tons, Boston Navy Yard paint and oil shop, to Concrete Steel Co., Boston.

160 Tons, Delaware County, Pa., bar mats for road construction, to Bethlehem Steel Co., Bethlehem, Pa.

100 Tons, Coatesville, Pa., high school, to Bethlehem Steel Co., Bethlehem, Pa.

CENTRAL AND WESTERN STATES

260 Tons, Seattle, Henderson Street sewage plant, to Bethlehem Steel Co., Seattle.

230 Tons, Crownover, Wash., Yakima project, to Bethlehem Steel Co., San Francisco.

150 Tons, Leavenworth, Wash., Columbia Basin project (Invitation 38189-A), to Northwest Steel Rolling Mills, Inc., Seattle.

130 Tons, Columbus, Ohio, Fifth Street bridge over Olentangy River, to Bethlehem Steel Co., through Visintine & Co., contractors.

109 Tons, Fillmore, Cal., Sespe overflow bridge, to Consolidated Steel Co., Los Angeles, through R. A. Bell & D. E. Metzger, Los Angeles, contractors.

NEW REINFORCING BAR PROJECTS

NORTH ATLANTIC STATES

500 Tons, Everett, Mass., Colonial Beacon Oil Co. tanks.

400 Tons, Portsmouth, N. H., Navy Yard warehouses; previously reported 200 tons.

355 Tons, Wayne County, N. Y., mostly mesh, highway project R.C. 4006; Warren Bros. Roads Co., Cambridge, Mass., low bidder.

350 Tons, Philadelphia, school; bids Nov. 30.

340 Tons, Chester, Pa., sewage disposal plant; bids in.

300 Tons, Reading, Pa., reservoir; bids Nov. 23.

253 Tons, Harrisburg, second section, superhighway from Harrisburg to Pittsburgh.

164 Tons, Rockland County, N. Y., mostly mesh, highway project R.C. 4005; Malloy & Murray Contracting Co., Inc., Yonkers, N. Y., low bidder on general contract.

150 Tons, Dutchess County, N. Y., mesh, highway project R.C. 4007; John Arborio, Inc., Poughkeepsie, N. Y., low bidder on general contract.

110 Tons, Green Haven, N. Y., water supply system.

CENTRAL AND WESTERN STATES

1354 Tons, Redding, Cal., Central Valley project (Invitation 33016-A); bids Nov. 28.

1000 Tons, Louisville, Ky., housing project.

850 Tons, Odair, Wash., Grand Coulee Dam (Invitation A-38215A); bids Nov. 30.

485 Tons, San Francisco, Laguna Honda Home; Monson Brothers, San Francisco, low bidders on general contract.

442 Tons, Hamilton Field, Cal., runway; 110 tons reinforcing bars, 332 tons fabric.

415 Tons, Sandusky, Ohio, rail steel bars for filtration plant; bids taken Nov. 22.

402 Tons, Roswell, N. M., bridges and culverts; bids in.

390 Tons, Lafayette, Ind., men's residence, Purdue University.

300 Tons, Jackson County, Ark., flood wall and Railway track reconstruction; bids at Little Rock, Ark., Nov. 29.

250 Tons, Fort Thomas, Ky., barracks.

250 Tons, Berkeley, Cal., police building; bids in.

230 Tons, Bloomington, Ind., women's dormitory.

213 Tons, Mare Island, Cal., dormitory at Navy Yard; K. E. Parker Co., San Francisco, low bidder on general contract.

200 Tons, Marked Tree, Ark., St. Francis drainage project; List & Weatherly, Kansas City, Mo., low bidders on general contract.

190 Tons, Denver, Montclair Reservoir; bids Nov. 30.

174 Tons, Oakland, Cal., Fremont High School gymnasium; bids in.

150 Tons, St. Louis, ward building for Robert Koch Hospital; C. H. Schroeder Building & Construction Co., St. Louis, low bidder on general contract.

135 Tons, Jefferson County, Ark., drainage distribution; bids at Little Rock, Ark., Nov. 30.

125 Tons, Millbrae, Cal., grammar school.

123 Tons, Mare Island, Cal., transmitting station; George J. Maurer, Piedmont, Cal., low bidder on general contract.

. CAST IRON PIPE .

Hamilton, Mass., will close bids Nov. 28 on about 1000 tons of pipe and fittings.

Lincoln, Mass., has awarded 21,000 ft. of 8-in. pipe and smaller quantities of other dimensions to Warren Foundry & Pipe Corp., Boston.

Treasury Department has awarded 130 tons of pipe for Revere, Boston and Everett jobs to Warren Foundry & Pipe Corp., Boston.

Pensacola, Fla., plans about 11 miles of 6 to 12-in. pipe for main water supply; also for extensions in distributing lines and other waterworks installation. Cost about $107,000. Financing has been arranged through Federal aid.

Greenville, S. C., plans new 30-in. line for main water supply from Table Rock reservoir to city limits. Cost about $1,454,000, of which municipality will provide $799,700 and remainder secured through Federal aid.

Newport, R. I., plans pipe lines for water system and other waterworks installation. Cost about $225,000, of which $101,115 will be secured through Federal grant.

Framingham, Mass., will take bids soon for main water lines and extensions and replacements in distributing lines; also for new pumping station and other waterworks installation. Cost about $300,000. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Cornwall-on-Hudson, N. Y., will take bids soon for pipe lines for water system and other waterworks installation, including new reservoir. Cost about $166,000, of which $70,425 will be secured through Federal grant. Henry W. Taylor, 9 Park Place, New York, is consulting engineer.

Electra, Tex., asks bids until Nov. 29 (extended from Nov. 22) for pipe lines for extensions and replacements in water system, including other waterworks installation. Fund of $145,000 has been arranged. Joseph E. Ward, Harvey-Snider Building, Wichita Falls, Tex., is consulting engineer.

Menlo, Iowa, closes bids Nov. 28 for 20,000 ft., various sizes, for water system; also for about 3300 lb. of fittings, hydrants, valves, etc. (Division C); 50,000-gal. elevated steel tank on 100-ft. steel tower (Division B); new pumping station, with motor-driven pumping unit and accessories (Division A). Thomas S. DeLay, Creston, Iowa, is consulting engineer.

East Tupelo, Miss., asks bids until Dec. 1 for pipe lines for water system and other waterworks installation. Feemster & Striger, Tupelo, Miss., are engineers.

Milton Junction, Wis., asks bids until Dec. 2 for pipe lines for water system; also for valves, hydrants, etc. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer.

Sebewaing, Mich., closes bids Nov. 28 for 41,000 ft. of 2 to 6-in. pipe for water system; also for gate valves, cast iron specials, fire hydrants, 75,000-gal. elevated steel tank and tower, deep-well turbine pumping unit and auxiliary equipment. Cost about $92,700. Financing has been arranged through Federal aid. R. A. Murdock, Fairview, Mich., is consulting engineer.

Wadesboro, N. C., asks bids until Dec. 2 for 13,300 ft. of 10-in. pipe for new force main for water system; also for 300,000-gal. tank on steel tower, with alternate bid on 200,000-gal. tank on 124-ft. steel tower, and 40,000-gal. tank on 40 ft. steel tower. Paul M. Van Camp, Southern Pines, N. C., is consulting engineer.

Pittsburg, Cal., has awarded 325 tons of 18-pipe to United States Pipe & Foundry Co., San Francisco; Robert B. McNair, Oakland, Cal., is contractor.

Department of Water and Power, Los Angeles, has awarded 113 tons of 16-in. pipe to United States Pipe & Foundry Co., San Francisco.

Lexington, Ore., plans pipe lines for extensions and replacements in water system, including valves, hydrants, etc. Cost about $33,689, of which $14,689 will be secured through Federal grant.

Rogue River, Ore., has placed 110 tons of 4 and 6-in. pipe with Pacific States Cast Iron Pipe Co., Provo, Utah; Soule & Walters, Elma, Wash., are contractors.

Clerical Employees at Gary Mills Organize

CHICAGO.—Clerical employees of the Gary sheet and tin mills of Carnegie-Illinois Steel Corp. have formed a non-profit organization called the Association of Steel Clerks, Inc. Chartered under Indiana laws, the association includes 225 members, with about 100 other employees still eligible to enroll. According to the charter, no affiliation with any labor union is intended, now or later. The purpose of the organization is to advance the social and economic interests of members with no previous representation of this type. Richard A. Rose is president.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Inquiries are in fairly good number in some centers, but orders are not showing much recovery . . . Improvement of importance may not come until next year.

Detroit Market Is in An "In-Between" Period

DETROIT—The machine tool market here is in the "in-between" period with many new projects brewing, but none at the inquiry or order-placing stage yet. It has been learned that Allison Engineering Division of General Motors at Indianapolis is retooling and modernizing production and gaging setups for bearing manufacture. This General Motors division is an important supplier of bearings and bushings for the aircraft industry.

Better Feeling in the East Yet to Show in Orders

NEW YORK—November thus far has not made much of a showing compared with October so far as orders are concerned. There is a better feeling since the elections, but many judge that it will be after the first of the year before this feeling is translated into much new machinery buying. There are some inquiries out, but not in any great volume. Formal specifications are coming out for bids each week from the New York Navy yard, and there is talk of a much larger buying program for machinery on the 1939-40 budget. As regards buying on the part of general industry, there seems to be much more activity in western New York State than in the metropolitan area.

Sentiment But Not Orders Improved at Chicago

CHICAGO—Although sentiment has improved a great deal since the elections, machinery sellers here do not look for much new business before next year. Appropriations are mostly expended by now, and little new expansion, modernization or replacement is expected in 1938. A noticeable increase in quotations is reported by some offices as a result of the Republican victories earlier this month. Thus far, however, only the usual number of orders has been received. November bookings are holding even with October in some cases, and showing a slight gain in others. Small tool sales so far in the month have not improved.

Orders and Inquiries are Holding Up at Cleveland

CLEVELAND — Orders and inquiries are holding up well in this vicinity. From the number of propositions now active, sellers believe the remainder of the year will be good. Sales during the past week include a number of lathes for Ohio users. At Tiffin several weeks ago a number of machines were replaced, including a surface grinder and several lathes.

Cincinnati Is Experiencing a Period of Slack Buying

CINCINNATI—Machine tool demand in the past week was about on a level with that of the preceding period. A slackness which set in the latter part of October has carried through the month. Foreign demand has gained a bit to bring it about a third higher than domestic business. Reports of early automotive retooling give an optimistic undertone to the market. Plant operations are unchanged as some backlogs are still carried.

. GREAT BRITAIN .

. . . 1939 price announcement expected soon . . . Anglo - American agreement of little effect on U. K. steel industry.

LONDON, Nov. 22.—The Anglo-American agreement has little effect upon the United Kingdom steel industry, which was not represented during the discussion owing to the existence of an International Steel Cartel.

The 1939 price announcement is expected within two weeks. There is much speculation as to the duration of the new prices. It is possible that they will be only for six months with further review before the close of that period. Meantime business is generally in abeyance except for delivery this year.

United Kingdom imports during October of all kinds of iron and steel amounted to 52,400 tons, of which 5400 tons came from the United States. October exports of pig iron amounted to 12,700 tons, of which none went to the United States. Total iron and steel exports amounted to 159,000 tons.

The tin plate market is moderately active, but overseas buyers are generally awaiting next year's prices. October's exports amounted to 29,000 tons.

Old Castle, Western, Ashburnham, Kidwelly, and Teilo tin plate companies, comprising 42 mills, all subsidiaries of Llanelly Steel, are proposing to form a merger to meet competition expected from the new Ebbw Vale strip mill. It is possible that a strip mill may be erected at Llanelly.

Exports of black sheets in October amounted to 3200 tons; of galvanized sheets, 14,000 tons. The black sheet market is quiet and the galvanized sheet market is practically idle.

The Continental steel market is quieter as export demand and speculative interest is diminished. It is believed that official prices remain unchanged for this year, but thin sheets to Finland and Sweden have been lowered 5s. gold. Poland has been granted a supplementary quota of 17,000 tons of steel, valid two months following acquisition of steel works in Czechoslovakia.

. . . CANADA . . .

. . . Airplane contracts placed by Britain . . . General business improving.

TORONTO, Nov. 22.—New business is developing at a steady rate in the Canadian iron and steel markets. The automotive industry is getting under way toward high operating schedules and officials of Canadian companies predict a record year for 1939 with regard to production and sales.

The new trade treaty between Canada and the United States is causing some uneasiness and consideration is being given to the sending of a delegation to Ottawa to contest the effect on the automotive trades.

Airplane contracts involving upwards of $10,000,000 have been awarded to Canadian concerns. The first award calls for 80 bombers of the Hampden type with the motors to be provided by England.

Merchant pig iron sales are picking up steadily and melters are taking iron for immediate needs with repeat orders appearing at frequent intervals. Producers state that prospects are favorable for more extensive purchasing for the first quarter.

In the iron and steel scrap markets business shows little change. Demand is specialized with principal call for heavy melting steel and machinery cast, both materials being in limited supply.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, plans one-story addition to branch plant at Oil City, Pa., for production of one, two and five-quart cans for lubricating oils. Cost close to $500,000 with equipment.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until Dec. 5 for 270 special class welded steel buoys (Circular 58183).

F. & M. Schaefer Brewing Co., 430 Kent Avenue, Brooklyn, has filed plans for two-story addition at 422-28 Kent Avenue, 143 x 264 ft., for service, repair and garage building for company motor trucks and cars. Cost about $275,000 with equipment. Eggers & Higgins, 542 Fifth Avenue, New York, are architects.

New York State Department of Social Welfare, 112 State Street, Albany, N. Y., plans one and two-story additions to State industrial school at Industry, N. Y. Cost close to $2,000,000 with equipment. W. E. Haugaard and T. F. Farrell, both State Building, Albany, are architect and engineer respectively.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 2 for one motor-driven coil-winding machine (Schedule 4945) for Brooklyn Navy Yard; until Dec. 6, 32 boiler water gages and spare parts (Schedule 4967) for Brooklyn and Philadelphia yards.

Wishnatzki & Nathel Co., 313 Washington Street, New York, food products, has let general contract to J. C. Clarkson Construction Co., Clearwater, Fla., for new one-story packing plant at Plant City, Fla. Cost close to $45,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 28 for 1000 coils, also quantity of voltmeters (Circular 85).

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans manual training shops in new three-story Benjamin Franklin High School on East River Drive, between 114th and 116th Streets. Cost $2,695,000. Eric Kebbon, Flatbush Avenue Extension and Concord Street, Brooklyn, is superintendent of buildings, design and construction.

Port of New York Authority, 111 Eighth Avenue, New York, Frank C. Ferguson, chairman, asks bids until Dec. 6 for electric equipment for Lincoln tunnel, West of Pleasant Avenue, Union and North Bergen, N. J. (Contract MHT-79).

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 28 for eight steel rota-bins, each with 80 compartments; three rota-bin units, each 6 ft. long, 24 in. deep and 42 in. high; two steel rota-bins, circular type, nine tiers high, 30 divisions each 7½ ft. high overall, with double shelf on top (Circular 396); tools and attachments, including magazine feed, for machining mechanical pieces (Circular 397).

Ciba Pharmaceutical Products, Inc., Lafayette Park, Summit, N. J., has let general contract to Walter Kidde Constructors, Inc., 140 Cedar Street, New York, for two-story and basement addition, 55 x 63 ft., with one-story and basement unit adjoining 54 x 90 ft. Cost over $65,000 with equipment. R. DeVere Hope, 1172 Raymond Boulevard, Newark, N. J., is consulting engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 2 for four hydraulic pumping units, eight hydraulic motors and spare parts (Schedule 4924), one hydraulically-operated stretching press (Schedule 4957), two motor-driven welding positioners (Schedule 4943) for Philadelphia Navy Yard.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Nov. 28 for six grinders, four spindle driving units, complete (Circular 475), test chamber control equipment (Circular 472); until Dec. 1, 135 to 160 sets of automatic gun control equipment, for mount machine gun, cal. 0.50; 40 to 80 similar control equipments for 37 mm., A.A. gun; and 1354 flexible and casing assembly shafts (Circular 442).

Richmond Fireproof Door Co., Richmond, Ind., has taken over plant, machinery and other equipment of Reliance Bronze Steel Corp., 95 Dobbin Street, Brooklyn. W. B. Keller, identified with Richmond company for past 16 years, will be manager of the Brooklyn plant in which hollow metal doors, steel frames and passenger elevator fronts will be manufactured.

BUFFALO DISTRICT

Socony-Vacuum Oil Co., 1100 Elk Street, Buffalo, plans addition to local gasoline refinery for new Houdry process unit, and steel tank storage facilities. Cost over $500,000 with equipment. Main offices of company are at 26 Broadway, New York.

United States Engineer Office, Federal Building, Buffalo, asks bids until Nov. 29 for one forged steel rudder stock, two cast steel rudder

stock nuts, and two forged steel pump tail shafts (Circular 59).

Board of Education, Kenmore, N. Y., plans manual training equipment in new three-story senior high school, for which bids have been asked on general contract. Cost about $1,620,000. Financing has been arranged through Federal aid. F. J. and W. A. Kidd, 524 Franklin Street, are architects, and Thomas H. McKaig, 505 Delaware Avenue, consulting engineer, both Buffalo.

NEW ENGLAND

Bureau of Yards and Docks, Washington, has asked bids on general contract for six-story building, 100 x 200 ft., at Portsmouth, N. H., Navy Yard, for equipment storage and distribution. Cost about $360,000 exclusive of equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 28 for 24 reamers and six sets of cutters (Circular 153); until Nov. 29, 3000 aluminum alloy castings, 1000 aluminum castings, and 665 bronze castings (Circular 162), 237 barrel reflectors, caliber 0.30 (Circular 176); until Dec. 5, one superficial hardness tester (Circular 151).

Constructing Quartermaster, Fort Ethan Allen, Vt., asks bids until Nov. 28 for locknuts, bushings, power panels, conduit, wire and other equipment (Circular 6671-16).

Boston School Buildings Department, 28 Norman Street, Boston, will ask bids soon on general contract for one-story top addition, 62 x 201 ft., to two-story trade school at 556 Parker Street, Roxbury. Cost about $90,000 with equipment. Financing has been arranged through Federal aid. Joseph J. Driscoll, 7 Water Street, Boston, is architect.

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for four 50-ton traveling jib cranes, three diesel-electric and one gasoline-electric, for navy yards at Boston, Philadelphia, Mare Island, and Puget Sound, respectively (Specifications 9003); bids (no closing date stated) for two 5000 cu. ft. per min. motor-driven air compressors, with inter and after-coolers, for Pearl Harbor, T.H., Navy Yard (Specifications 9028); bids (no closing date stated) for boiler units, pulverized coal or stoker equipment, mechanical draft fans, preheaters or economizers, air and flue gas ducts and boiler accessories for power house at Norfolk Navy Yard (Specifications 8822).

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 5 for one planer, lathe, radial drill press, punch and shear, two pipe-cutting and threading machines, wood-working mortiser and wood-working saw, all motor driven, and one steam hammer (Schedule 3399).

United States Engineer Office, Post Office and Court House, Norfolk, Va., asks bids until Dec. 14 for alterations and improvements in welded steel lock, comprising two leaves, for guard lock in inland waterway, Great Bridge, Va.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for 26 steel mooring buoys (Schedule 4918), wood boring bits, chisels and knives (Schedule 4869), air pressure reducing valves (Schedule 4882); until Dec. 2, spare parts for diesel engines (Schedules 900-2090 and 900-2147) for Eastern and Western navy yards; until Nov. 29, six arc welding machines and 110 welding outlet panels and reactors (Schedule 4951) for Boston Navy Yard; two sets of distant reading tank gages (Schedule 4923); until Dec. 2, one milling machine (Schedule 4939) for Portsmouth, N. H., Navy Yard; single head punch (Schedule 4945), metal-cutting machine (Schedule 4944), all motor driven.

SOUTH ATLANTIC

Atlanta Water Works, Atlanta, Ga., W. Z. Smith, general manager, will take bids soon for extensions and improvements in waterworks pumping station, including two 550-hp. boiler units with stokers and accessory equipment, one 175-kw. turbo-generator unit with auxiliary equipment, one 40,000,000-gal. per day motor-driven pumping unit and miscellaneous equipment. Fund of $215,000 has been arranged through Federal aid.

Higgins Foundry Co., 1244 Higgins Street, Atlanta, Ga., gray iron castings, etc., plans rebuilding part of foundry recently destroyed by fire. Loss close to $40,000 with equipment.

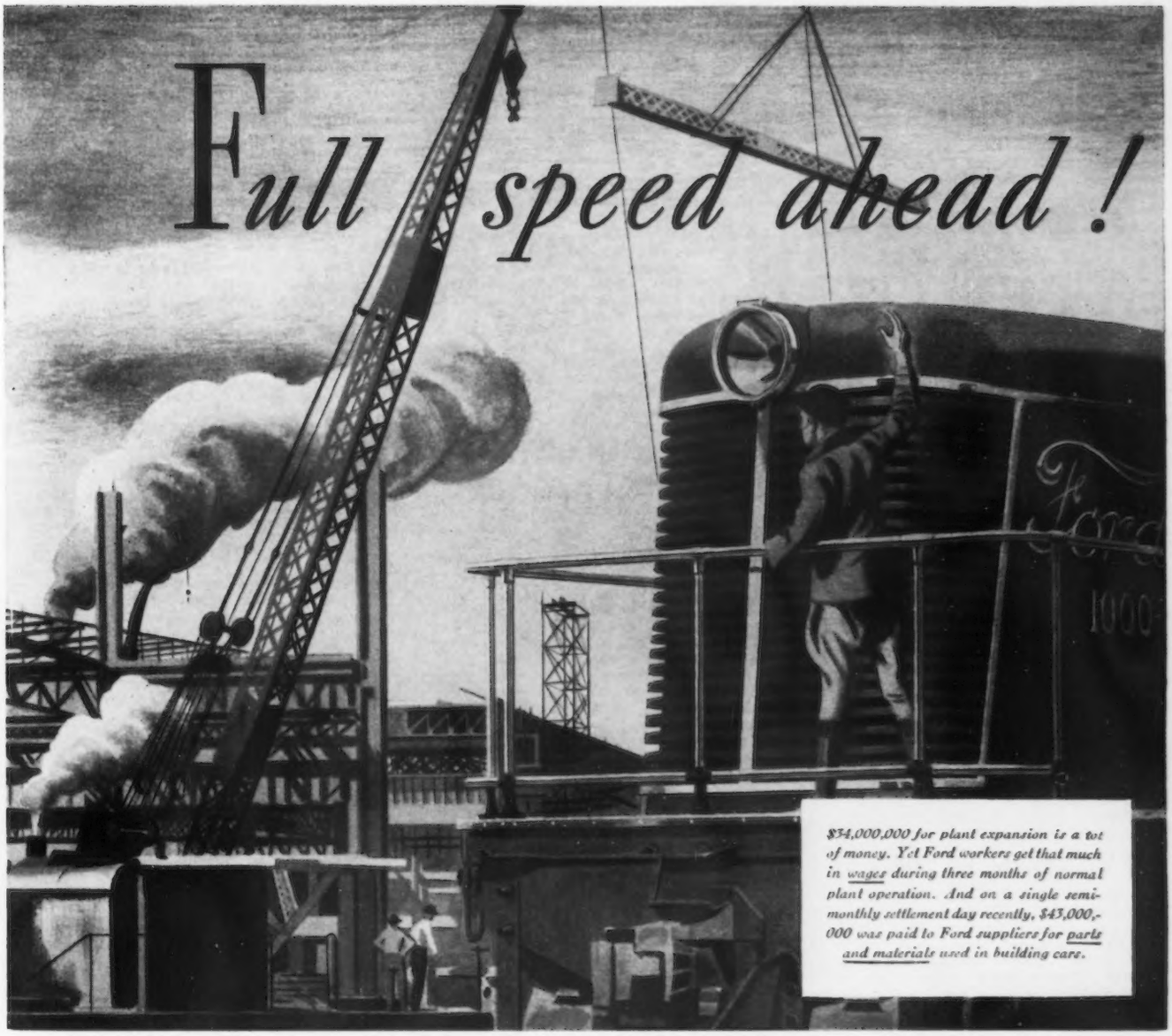
City Council, Spartanburg, S. C., plans new steel hangar, with shop facilities for repair and reconditioning, at Spartanburg Memorial Airport. Fund of $200,000 has been arranged for hangar, administration building and other improvements.

SOUTH CENTRAL

Gulf Shipbuilding Corp., Mobile, Ala., T. M. Stevens, vice-president and general counsel, recently organized with capital of $1,000,000, has purchased local plant of Chickasaw Shipbuilding & Car Co., idle for most part since 1922. New company will modernize plant for new shipbuilding and repair works; new buildings will be erected to replace certain existing structures and new equipment installed. Cost over $250,000. Tract comprises about 90 acres and part of property has been used by Ingalls Iron Works, Birmingham, for construction of welded steel barges, dredges and tankers, which works will be maintained as heretofore. D. R. Dunlap is chairman of board of new company; E. A. Roberts, president; and H. C. Slaton, secretary and treasurer.

Middle Tennessee Packing Co., Columbia, Tenn., food products, plans rebuilding part of packing plant recently destroyed by fire. Loss close to $40,000 with equipment.

City Council, Fort Payne, Ala., asks bids until Nov. 30 for new municipal electrical dis-



Moving steadily forward, the expansion program of the Ford Motor Company, undertaken early this year, is nearing completion. Nearly $34,000,000 is being expended for new construction and new equipment.

. . .

But what does $34,000,000 for plant expansion mean?

From our standpoint, it is a continuing expression of confidence in the future.

To you, as customer, it means new and better facilities for building even greater value into the car or truck you buy.

To various American industries, it means orders for thousands of tons of steel and other building materials. It means hundreds of new machines and additional equipment. To the employees of these industries it means more work and more money for more men.

For today's construction becomes tomorrow's payroll. New plants, new products, new machinery, new manpower call for still greater purchases of raw material and supplies.

It is like tossing a pebble into a pool; you can see the circles widen.

It is the Ford belief that industrial progress—which is a constant striving for new and better ways to build better products at lower cost—is the only sound foundation for a lasting prosperity.

America knows but one direction, and that is—*onward!* Time will bring changes, but *not* in the *main course.* The openings and opportunities for men and women who can *do* things, who *know their jobs,* are becoming more numerous. Our schools should bear this in mind and prepare their students *for life.* Every school should be a place where students *learn by doing.*

Henry Ford

FORD MOTOR COMPANY

MAKERS OF FORD, MERCURY, LINCOLN-ZEPHYR AND LINCOLN MOTOR CARS

tribution system, including transmission line for connection with power source and other operating facilities. Cost about $115,000. James M. Todd, Balter Building, New Orleans, is consulting engineer.

SOUTHWEST

Carter Carburetor Corp., 2820 North Spring Street, St. Louis, has let general contract to Austin Co., Arcade Building, for one-story addition for storage and distribution. Cost close to $40,000 with equipment.

City Council, Paola, Kan., has called special election Dec. 5 to approve bond issue of $175,000 for new municipal electric power plant and distributing system. Diesel engine-generator units and accessories will be installed. Cost about $240,000, remainder of fund to be secured through Federal aid. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

City Council, Tucumcari, N. M., plans new municipal electric power plant, using diesel engine-generating units and auxiliaries; also distributing system. Cost about $416,363, of which $187,363 has been secured through Federal aid. Powell & Goldenberg, 127 East Water Street, Santa Fe, N. M., are consulting engineers.

City Council, Columbia, Mo., is asking bids on general contract for new steel hangar, 100 x 125 ft., at municipal airport, with shop facilities for repairs and reconditioning. William M. Spann, Interstate Building, Kansas City, Mo., is consulting engineer.

Texas Foundries, Inc., Lufkin, Tex., W. C. Trout, president, recently organized with capital of $450,000 by Mr. Trout and associates, has plans for one-story foundry to specialize in production of malleable iron castings for heavy machinery and other service. Cost over $75,000 with equipment.

Murray Rubber Co., Milby and Burch Streets, Houston, Tex., manufacturer of molded rubber products, has let general contract to R. C. Paul, 4114 Glenbrook Court, for one-story mill addition, 60 x 120 ft., with wing extension, 20 x 25 ft. Cost about $45,000 with equipment. Herbert Caldwell, 4109 Glenbrook Court, is architect.

WESTERN PA. DIST.

A. McAllister Mfg. Co., 427 Coleman Street, Johnstown, Pa., beverages, plans new two-story and basement mechanical-bottling plant, 40 x 60 ft. Cost over $45,000 with equipment.

City Council, Ravenswood, W. Va., plans extensions and improvements in municipal waterworks station, including new electric generator unit and accessories, pumping machinery and other equipment. Cost about $50,000, of which $22,500 has been secured through Federal aid.

Purchasing and Contracting Officer, Quartermaster Corps, Charleston, W. Va., asks bids until Nov. 29 for one electric arc welder, two drill presses, 22 wood-working lathes, five 3-hp. gasoline engine units, 12 circular saws, 12 jointers, 12 belt and disk combination surfacers, 15 motors and other equipment (Circular 5505-10).

OHIO AND INDIANA

Mansfield Tire & Rubber Co., Mansfield, Ohio, has approved plans for two-story and basement addition, 95 x 152 ft., for expansion in mixing, vulcanizing and other production departments. Cost about $150,000 with equipment.

New York, Chicago & St. Louis Railroad Co., Terminal Tower Building, Cleveland, has let general contract to Klein Steel Co., Bellevue, Ohio, for rebuilding part of repair and construction shops at Bellevue, recently destroyed by fire, including new motor car shops, rail mill, forge and blacksmith shop. Cost over $75,000 with equipment.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, asks bids until Nov. 28 for one tube and fitting machine (Circular 315), 359 fire axes and 166 hunters' hatchets (Circular 363), 13 alternator assemblies and 13 dynamotor assemblies (Circular 370), engine exhaust collector assemblies, adapter, tank and shaft assemblies, one surface assembly (Circular 339), flexible landing gear retractable tube assemblies (Circular 368), 141 double-arm lighting units (Circular 371); until Nov. 29, twist drills (Circular 372); until Nov. 30, valve seat grinder, locating plate cylinder, grinding wheel spindles, grinding wheel spindle sleeves, wheels for cylinder, bluing gage for cylinder (Circular 373), starter assemblies (Circular 331); until Dec. 1, about 300,000 hose clamps (Circular 366).

Board of Education, Kokomo, Ind., asks bids until Nov. 29 for steam power plant, 44 x 75 ft., for central-heating service for schools, including boiler units, stokers, pumps and auxiliary equipment. Cost about $80,000. Financing has been arranged through Federal aid. McGuire & Shook, Fletcher Trust Building, are architects, and John M. Rotz Engineering Co., Merchants' Bank Building, mechanical engineer, both Indianapolis.

Board of Public Works, Crawfordsville, Ind., will take bids soon for 5000-kw. turbo-generator unit and accessories, condenser, pumping machinery, etc., for municipal electric power plant. Commercial Testing & Engineering Co., 307 North Michigan Avenue, Chicago, is consulting engineer.

MICHIGAN DISTRICT

Fruehauf Trailer Co., 10940 Harper Street, Detroit, motor trailers and parts, has awarded general contract to Collins Construction Co., Davidson Building, Kansas City, Mo., for one-story addition, 100 x 150 ft., to branch assembling, storage and distributing plant at Funston and Chrysler Roads, Kansas City. Cost over $75,000 with equipment.

Board of Public Works, Kalamazoo, Mich., plans extensions and improvements in municipal waterworks station, including pumping machinery and auxiliary equipment. Fund of $207,000 has been arranged for this and extensions in system, etc. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Quartermaster, CCC, Fort Brady, Mich., asks bids until Nov. 28 for wood-working machinery, 11 smoke jacks and 10 sheet metal galvanized stove hearths (Circular 4601-24).

Board of Education, 1354 Broadway Avenue, Detroit, plans manual training equipment in new three and four-story high school on Wyoming Avenue, for which general contract has just been let to A. W. Kutsche Co., 2111 Woodward Avenue. Cost about $720,000. Malcolmson, Calder & Hammond, 1217 Griswold Street, are architects; Snyder & McLean, Penobscot Building, are mechanical engineers.

MIDDLE WEST

Joyce 7-Up Co., Joliet, Ill., beverages, has selected three-acre tract for new two-story mechanical bottling plant, including division for general manufacture. Bids will be asked soon on general contract. Cost about $250,000 with equipment.

R. Hoffman, 2720 Granville Avenue, Chicago, has let general contract to Welso Construction Co., 2233 West Grand Avenue, for new one-story foundry, 41 x 75 ft., for production of gray iron castings. Cost close to $40,000 with equipment. M. Palmer, 36 South State Street, is architect.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Nov. 28 for 25,500 steel elastic stop nuts (Circular 374), cold drawn seamless steel tubing (Circular 377), 50 to 100 high-speed adapters for 75-mm. gun (Circular 379), 18 propeller shafts, 20 thrust washers and 40 lock plates (Circular 373), gages, including plug, ring, snap, flush pin, etc. (Circular 356), brass fittings, brass unions, brass globe valves, brass check valves, gate valves, angle vales, air cocks, galvanized malleable iron unions, malleable iron pipe fittings, cast iron pipe fittings (Circular 376), rubber-covered copper wire, couplings, toggle bolts, keyless sockets, socket bushings, double arming bolts, expansion screw anchors, etc. (Circular 375).

City Council, Milford, Iowa, asks bids until Nov. 28 for one 350-hp. diesel engine unit, with auxiliary equipment, for municipal power plant. Ralph W. Gearhart, 349 Twenty-first Street, S.E., Cedar Rapids, Iowa, is consulting engineer.

United States Office, Fort Peck, Mont., asks bids until Nov. 28 for two two-drum steam winches, without boilers (Circular 150), 6000 lb. track spikes, 2000 lb. track bolts, and 1500 carriage bolts (Circular 158).

Purchasing Agent, Bureau of Reclamation, Denver, asks bids until Nov. 30 for open-hearth carbon rails, intermediate steel tie plates, intermediate steel rail gage plates with bolts, combination intermediate and joint steel gage plates for bridge ties with bolts, track spikes, track bolts and nuts, steel angle bar compromise joints for use with rails, spring washers; rail anti-creepers, non-insulated split switches, spring-rail frogs, rail-bound manganese frogs, guard rail for frogs and other railway track equipment (Specifications 33,-105-A).

Western Refrigerator Lines, Northern Building, Green Bay, Wis., manufacturer of railroad freight refrigerating equipment, has placed general contract with Wisconsin Bridge & Iron Co., Milwaukee, for new car repair building. No estimate of cost has been given.

City Council, Cumberland, Wis., closed bids Nov. 17 for construction of municipal power plant, diesel engine generating equipment and ornamental street lighting system. Engineer is G. L. Van Fleet Co., 649 West Locust Street, Dubuque, Iowa.

Nunn-Bush Shoe Co., 2822 North Fifth Street, Milwaukee, is about to ask bids on new power plant, 50 x 90 ft., 30 ft. high., to cost about $50,000. Engineer is Oscar A. Kisa, 2932 North Newhall Street, Milwaukee.

PACIFIC COAST

Hills Brothers Coffee, Inc., 2 Harrison Street, San Francisco, has purchased 30 acres at Elmhurst, Ill., for new Eastern branch plant for coffee-roasting, mixing, packing, storage and distribution. It will comprise main one and two-story unit with smaller adjoining buildings, power house and other mechanical departments. Cost about $700,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for superstructure for assembly and repair shop at naval air station, Alameda, Cal. (Specifications 9033); also bids (no closing date stated) for steel caisson gates, including pumping units, gate valves, fittings, motors and electrical installation at Puget Sound Navy Yard (Specifications 8969).

Fernando Milling & Supply Co., 6104 Van Nuys Boulevard, Van Nuys, Cal., plans rebuilding grain milling plant recently destroyed by fire, comprising main one-story building and two four-story elevator units. Loss about $250,000 with equipment.

Coca-Cola Co., 963 East Fourth Street, Los Angeles, will take bids soon on general contract for three-story and basement addition, 120 x 120 ft., to beverage-manufacturing and mechanical-bottling plant. Cost over $100,000 with equipment. Jesse M. Shelton, Atlanta, Ga., is architect; W. P. Weisiger is resident engineer in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for one motor-driven vertical milling machine (Schedule 4875) for Mare Island Navy Yard; one motor-driven thread grinder (Schedule 4874) for Puget Sound yard; until Dec. 2, spare parts for airplanes, comprising aluminum alloy extruded shapes (Schedule 900-2193), quantity spare parts for airplanes (Schedule 900-2199) for San Diego Naval Air Station; until Dec. 6, bonded lead-lined steel and copper tubing (Schedule 4916) for Mare Island and Puget Sound yards.

Constructing Quartermaster, Sacramento Air Depot, Sacramento, Cal., asks bids until Nov. 29 for construction of gasoline fueling system for engine test building at local air station (Circular 6870-10).

FOREIGN

South Wales Aluminum Co., Ltd., Glamorganshire, South Wales, England, recently organized with capital of $2,500,000, has selected local tract as site for new plant, to comprise one and multi-story buildings, with smelting unit, power house and other divisions. Cost over $1,000,000 with equipment. Company is an interest of British Aluminum Co., Ltd., with main plants at Kinlochleven, Argyll, and Bank Quay, Warrington; and Aluminum Co. of Canada, Ltd., 158 Sterling Road, Toronto, Ont.